The Builder.

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Building and Excavation in Rome.

THE restoration of Roman monuments in style more or less architectonic can scarcely be dated from any period earlier than the present century, anterior to which her rulers and aristocracy were rather bent upon either demolishing or appropriating to their own uses this city's classic remains. About the earliest instance of *improvement*, with view to rescuing from neglect and decay, though not actually to restoring, was the disencumbering of the Colosseum, ordered in 1675 by Clement X. Under the present pontificate the activity in public works of various kinds has surpassed almost all antecedents in Papal story since the energetic reign of Sixtus V.; and the discoveries made have been most important for the light thrown by them both on Pagan and Christian antiquity. Two disinterred basilicas, on the Campagna, have supplied illustration and local church-history; and the extended range of catacombs given to public inspection has added to the most prized records of primitive Christianity. The Servian fortifications discovered in two places on the Aventine Hill, in the Jesuits' Vineyard (1851), and shortly afterwards in the gardens of S. Sabina, the Dominican Convent, have confirmed the conjectures of well-known writers as to their plans and extent; as also the remarkable fragment of massive stone walls, found on the north-western slope of the Palatine in 1847, has corroborated the tradition of the "Roma Quadrata," most ancient nucleus of the metropolis subsequently extended over the Seven Hills; while the immense constructions in lithoid tufo and travertine, brought to light under S. Clemente in works still progressing at that church on the Cœlian, may be assumed to supply sanction for the more vague theories respecting cities on these renowned hills in an ante-Roman and even pre-historic period. With an exchequer reduced to about one-fifth its former amount of annual receipts, the present government has seldom allowed any suspense of undertakings aiming at public benefit or antiquarian research. Pius IX. has never wanted the king-becoming virtue of open-handed generosity or munificence in the promotion of artistic or charitable objects; and it is reported in trustworthy quarters that for gifts to sovereigns or other favoured persons he has spent more than 60,000 scudi (about 330,000 francs) on pictures, sculptures, bronzes, mosaics, engravings, in great part commissioned expressly, besides about 50,000 scudi on sacred vessels and ornaments for churches. Besides utilitarian advantages first secured to Rome under his rule—gas-illumination, railways, a suspension-bridge over the Tiber, restorations of gateways and walls,—are to be recorded the more decorative works for public monuments, and the repair of fountains, to whose amazing number—no fewer than 660—in this well-watered city, has been added another, with Ionic columns and entablature, on the newly-opened Piazza Pia, between the St. Angelo Bridge and St. Peter's. The injury done to the fortifications on the Trastevere side by the siege of '49 has been effaced by the renewal of the towered gateway, Porta S. Pancrazio, and a considerable extent of bastions on both sides; and the more ancient line of walls under the Pincian Gardens has been in part rebuilt, to supply stronger buttresses to the terrace-walks of that favourite promenade, fortunately without sacrificing that curious remnant of overhanging walls, the Muro Storto, still in exactly the same condition as they are described by Procopius, and were superstitiously revered by the populace during the Gothic siege in the sixth century. Another gateway now being rebuilt is the Porta Pia, on the Nomentan Way, originally raised by Michelangelo, and first repaired about ten years ago, after injury by lightning; now to present an imposing front, with travertine columns on the outer side, and to be adorned by statues of St. Alexander and St. Agnes, because through this gate we pass to the extramural churches of those saints. At S. Maria Maggiore is being constructed a splendid confessional, or elliptical chamber, with steps leading to the chapel under the high altar, by arrangement similar to that at St. Peter's; and as this chapel, hitherto visited with difficulty by torchlight, contains sculptures of the fifteenth century that deserve to be seen, more objects than one will be obtained by the new disposal of the superb sanctuary. It is rumoured that here, within the ellipse before the altar, Pius IX. desires his own monument should find distinguished place.

Among antiquarian undertakings under this pontificate, first in order was that for the disencumbering of the half-buried sepulchres on the Appian Way, begun, under Cavina's direction, in 1850; next was the discovery of the Julian Basilica in the Forum; and a few years afterwards commenced, under superintendence of Visconti, the works still in progress for the disinterment of Ostia, great parts of whose streets and temples have been brought to light, like another Pompeii, after ages of oblivion; and there are few scenes so impressive in this vicinity as that now presented by the partially unburied city amidst the mournful desolation, not without its sad and romantic beauty, of that fever-stricken region. At the meetings of the Pontific Archæologic Institute, Visconti has been, from time to time, reporting on all the more noticeable fragments, epigraphs, and statuary dug up at Ostia, whence several portrait-busts of value have been transferred to the Vatican. In Rome has been found another large Columbarium, still retaining its urns and epigraphs, near the Porta Latina, and therefore not far from the two already open, remarkable for their preservation and monumental contents untouched. Besides undertakings in the metropolis and on its Campagna, works for restoration of the antique in other districts and provincial towns, have been numerous and well suggested in the period we are considering: for more completely isolating the Arch of Trajan at Benevento; for repairing the Temple of Clitumnus, near Spoleto; and the mausoleum-chapel of Galla Placidia at Ravenna; also for some requisite repairs to the ancient walls of Cori (which Gell supposes to be Pelasgic), and to the beautiful Doric Temple, dedicated, according to some authorities, to Hercules—others assume to Castor and Pollux,—that crowns the steep height on which Cori stands, above the valley of the Pontine Marshes. But sacred monuments and antiquities have engrossed the cares of authority and received new features of interest, much rather than those of different character, within this period. In 1854 occurred the discovery of the Basilica and Tomb of St. Alexander, on the Nomentan Way; and shortly afterwards that of St. Stephen's Basilica, alike completely hidden by the rising of the Campagna level, and for centuries forgotten save by the learned; the latter a church of the fifth century, founded by Leo "the Great." In November, 1854, was inaugurated the Christian Museum at the Lateran, filled with sculptured sarcophagi, epigraphs, and paintings (the latter copies) from the Catacombs, judiciously selected out of the most valuable in that range of antiques. Since the end of the sixteenth century the "Congregation of Indulgences and Relics" had been charged with the special care and vigilance over Rome's Catacombs, but they have been in later years watched over, and all excavations in them directed by the Committee of Sacred Archæology. For visiting the most interesting and easily accessible of these hypogees, tickets are given gratuitously to all applicants,* at the office of the Cardinal Vicar's secretary. The Roman catacombs may be subdivided into sixty, extending their corridors and chapels for about 900 miles, in different stories, under the soil of the Campagna, and supposed to have received the bodies of about seven millions of Christian dead. Their use for devotional purposes continued common till the ninth century; but the practice of frequenting them had not, it seems, entirely ceased even in the first years of the thirteenth century. Between 1592 and 1623 much activity was applied to their exploration, after the revival of interest in archæologic pursuits of the sacred sphere; but comparatively few of these subterraneans were known between the Mediæval and this later period, till the discoveries made by the indefatigable Bosio (deceased 1600), who spent more than thirty years in the studies and researches by which he rendered much service to Christian archæology. Since his time no one has effected so much for extending the range of permeable catacombs as the Chev. di Rossi, who, a few years ago, found the entrance to the principal ramification of those of St. Calixtus on the Appian Way, among the most important and rich in art-decoration, with oratories containing the tombs of Sixtus II., Urban II., Eusebius, and other Roman bishops; also that of St. Cecilia, a very curious picture of whom, on a wall in the same chapel, has been copied, besides other paintings in these catacombs, for the Christian Museum at the Lateran.

The now nearly complete basilica of St. Paul is the most splendid example of the munificence with which, spite of public disasters and financial embarrassments, the restoring and embellishing of churches have been effected under this Pontificate; and if we cannot often admire the taste, we must commend the generosity and enterprise displayed in this range of public works at Rome. In response to the circular of Leo XII., 1824, was soon contributed the amount of 1,600,000 francs from other European countries: a Protestant king (of Holland) advanced 50,000 francs; a Moslem prince sent enormous blocks of Oriental alabaster; but subsequently the costs have been defrayed mainly by the Papal treasury, out of which were assigned from the beginning 50,000 scudi per annum for the new edifice; and between 1825—37 had been spent on it 720,000 scudi; 400 labourers being daily employed during that first stage of the undertaking. An anomalous campanile at the eastern end (instead of being, like the ancient one, beside the western façade), has absorbed 120,000 scudi; and for the façades, only just begun, Pius IX. has presented 30,000 scudi out of his private purse, principally towards the costs of a great mosaic, from a design by Agricola, to adorn the upper part. The antique mosaics were fortunately, the greater part, saved

* In the present Pontificate, the visiting of the Catacombs has become admitted into the recognized range of "sight-seeing" at Rome by the whole tourist-public, as never the case formerly. Those for which orders are promptly given are the Catacombs of St. Agnes, on the Nomentan; of St. Calixtus (in the interesting ramification recently re-opened), on the Appian Way; of SS. Nereus and Achilleus, entered near to the former; and St. Alexander, below the exhumed church of that Pope. Others, far less interesting, that may be seen without order, are those of St. Sebastian and St. Pancrace, each entered from below the extramural churches of the same dedication, and where the escort of a friar from the adjacent convent is sufficient.

from the flames, though it has been necessary to alter their disposal over the interior walls. As to the exterior, the architects, Belli & Poletti, will assuredly find little mercy from the criticism of future ages for having, with almost unlimited means, erected an edifice quite below mediocrity, and with all its colossal pretensions, utterly meaningless, paltry to the last degree. Yet there is a regal grandeur in this vast interior that, at the first impression, astonishes and carries away the mind, subdued before that long-drawn perspective and extraordinary accumulation of splendours, however much we must condemn, in calm judgment, such anomalies as the modern Italian baldacchino, on immense alabaster columns, *above* that much smaller Gothic one, of the thirteenth century (a detail saved from the fire), which immediately overshadows the high altar; and the large frescoes along the attics, the lives of the two chief Apostles, by different Roman artists, are, generally speaking, of discordant effect, their tone glaring, their composition deficient in that elevated purity and repose which we admire in the modern sacred art of the Germans. Not a single work by Overbeck or Cornelius adorns this or any other Roman church; though sculptors of highest repute, as Tenerani, Rinaldi, Jacometti, have here contributed, and the St. Benedict, by the first of these, a seated colossal figure over the altar of a beautiful side chapel, is full of patriarchal dignity. The prescription of Leo XII., that the head should be essentially a reproduction of the ancient St. Paul's, has not been consistently observed; in the exterior, indeed, manifestly violated. Its present reality supplies proof how little Rome's artists are influenced by the high and pure type still presented by so many examples in this city, of the Early Romanesque basilica, the only characteristic and nobly religious architecture Rome ever produced under Christianity; and we might appeal to any capable of feeling, whether such temples as S. Sabina, S. Agnese, and S. Lorenzo, beyond the walls, be not far more elevating, and in their majestic simplicity more satisfying than all the overcharged magnificence of the new St. Paul's? The above-named S. Agnese, on the Nomentan Way, is another instance of restoration, with much rich embellishment, carried out under the present Pontiff. Its leading and very graceful features are still those of the original building raised by Honorius I. (625-38), and that olden architecture has been happily preserved intact, though a polychrome decoration, to imitate inlaid marbles, was carried along the spandrils and above the curves of the arches in the nave, medallion heads of Popes, benefactors to this church, interspersed over the same surface, and figures of the Virgin Martyrs painted along the attic above the double colonnade, when the whole was renovated, and the adjacent monastery rebuilt in 1856.

ON THE ARCH AND ARCADES.

PROFESSOR SMIRKE'S CONCLUDING LECTURE AT THE ROYAL ACADEMY.

I THINK it may fairly be said that most of man's greatest discoveries have been the result, humanly speaking, of accident. The manufacture of glass, and gunpowder, the discovery of the magnetic needle, and of the steam engine, are striking, although perhaps somewhat trite, illustrations of this truth. Indeed, the history of science is full of examples of what may be, in some sense, regarded as the *fortuitous* origin not only of the great inventions of human ingenuity, but of many of the subordinate improvements and accessories in art and science. It is not my purpose, however, on the present occasion to expatiate on this wide field of inquiry, or to consider with what propriety the process of the human mind by which it observes, and applies, and appropriates the suggestions offered by external objects, *can* be termed *accidental*.

My only reason for adverting to it is to introduce to your notice a very early and important discovery in the art of construction; a discovery, indeed, which led the way to some of the most important revolutions which have ever influenced the practice of architectural art. I refer to the discovery of the *arch*. I believe that this discovery may really, with great probability, be attributed to accident. This idea forcibly struck me when examining the remains of Pelasgic art in Etruria. We there see no traces of the use of the arch, it is true; but we see in the peculiar masonry of that early period what I cannot but believe to have been the germ of the arch; namely, that fortuitous fitting together of several stones which would admit of the removal of some of them without causing the disturbance of the rest. The pains-taking masons of that period could not have been long without perceiving the convenience resulting from this peculiar collocation to which I refer, and which is the special characteristic of the masonry of the Pelasgi, who are assumed to be the earliest civilized inhabitants of Italy.

I may add in corroboration of this conjecture, that in one of the early vestiges of ancient Rome, namely, the Emmissario at the Lago d'Albano, is a flat arch, such as is technically called a skeme arch, which is just the kind of arch that would naturally suggest itself as one of the first applications of the principle. I must not, however, detain you many minutes on this subject: it is too archæological to be suitable for our consideration here. In thus suggesting the possibility that the arch may have had its origin among the Etruscan masons, on observing the facilities occasionally offered by the collocation of stones in their *opus incertum*, I fear that I cannot claim for them the *exclusive* merit of the discovery; for there is no fact more certain than that arches were used by builders so widely separated from *them* and from each other, both by *time* and *space*, that we cannot reasonably suppose that one borrowed from the other, or that there was any interchange of knowledge.

Sir Gardner Wilkinson tells us of arches in *Egyptian* masonry, to which he considers himself justified in attributing the early date of 1200 B.C. We have, too, brought under our own eyes, in the British Museum, bas-reliefs carved with beautiful precision and in perfect preservation, the representations of walled cities, in which arched-headed doorways repeatedly occur. The date attributable to these examples is, according to our best authorities, the seventh or eighth century B.C. I am informed that quite recently certain excavations made by one of the religious societies, in a vineyard on the Aventine Hill, in Rome, have brought to light well-preserved portions of the ramparts attributed to the regal period of Roman history, composed of excellent masonry; and a perfectly well-constructed semicircular arch has been exposed to view. The antiquaries of Rome regard with confidence this arch as the work of S. Tullius, 578 B.C. The Cloaca Maxima, whose arched entrance into the Tiber is familiar to most who have visited Rome, is by common consent pointed to as the work of Ancus Martius, 640 B.C.; and this is a semicircular arch turned with excellently cut stone voussoirs. It is, therefore, impossible to deny the extreme antiquity of the arch; but what we may feel justified in saying is, that it has been an invention of slow growth; *i. e.* one of which the advantages and wide application were not at once and generally appreciated: nor were the æsthetic and constructive merits of the form marked by any very early recognition. That the Greeks did *not* use the arch is a pretty generally admitted fact: the absence of any indication of it in any remains of pure Greek work is sufficiently strong negative evidence; and the stratagems that we find the builders of that period resorting to in order to overcome difficulties which the arch at once effectually overcomes afford strong collateral proof. I would call attention, for instance, to the construction of masonry over an opening at one end of the Temple of Concord at Agrigentum, in Sicily. The courses sail over on either side of the opening with a view to diminish the bearing of its straight, flat lintel, whilst the ordinary relieving-arch would have answered the purpose so much more effectually.

However, it is certain that, whatever may have been the cause, whether ignorance or the force of habit, for a very long time indeed the value of the arch was not duly appreciated. Nor, perhaps, have we any right to taunt the builders of antiquity with the slowness of their apprehension. Even in our own age of science and civilization, and with all our modern means of interchange of knowledge, a hundred years or more passed between the first discovery of the mechanical power of steam and the full recognition of its utility.

We may regard it, I think, as pretty well agreed that architecture had not appropriated the arch as one of her important features until two or three hundred years before the Christian era. We find it in familiar use during the existence of the Roman republic; and, when once generally adopted, one of the most complete revolutions in the whole history of our art was effected. The whole character of Roman architecture under the emperors seems *influenced by the arch*. The great works of the Pantheon, the Colosseum, and indeed nearly all the great monuments of that age owe much of their character to this system of construction. It is probable that not æsthetic considerations alone, but motives of a practical nature, may have had much influence in favouring the use of the arch. The transport of large, heavy blocks must have at all times taxed the mechanical ingenuity as well as the pecuniary resources of builders. Even at the present day the cost of a stone increases with its size in a compound ratio: how much more so must this have been the case in the early times of which we are treating, when roads and canals scarcely existed? We may then well understand that a system of construction which not only admitted of, but which almost demanded, the use of stones of moderate size, was peculiarly welcome to the builder, and invited his adoption. How rejoiced, too, must have been the architect, to resort to a mode of construction by which not only *cost*, but *time*, was saved, and his boldest designs, his grandest ideas, might be realised in the least possible time. He had no longer to drag, perhaps from a remote distance, his cumbrous blocks of many tons weight, over a trackless country, and then to rear them, tediously and expensively, by the agency of a multitude of labourers. The nearest quarry would now probably be such as to furnish him with stones quite large enough wherewith to turn his arches, however gigantic their span.

Nor was he any longer compelled to select exclusively the hardest and strongest stones for his building: the pressure of weight upon the wedge-shaped voussoirs of an arch is to be measured by the *crushing* power of that weight, whereas the effect of the same weight bearing perpendicularly on a horizontal beam of stone would be much more effectual in fracturing and destroying it.

We see, too, how speedily the Roman builders found that an arch specially favoured the use of *bricks*. The more *ancient* types of temple architecture seem almost necessarily to exclude, in great measure, the use of bricks; whereas an arcuated construction was carried out in every way more advantageously with bricks than with stones.

We may consider, therefore, that it is to the ready applicability of bricks to arch-building, that we owe the existence of the stupendous Colosseum, the Temple of Peace, and others of Rome's proudest monuments.

I may here remark the fact that all the great distinctions of style in our art are traceable, not so much to the genius of the designers as to the *circumstances* of the *time* and the *place*.

How differently would the Egyptians have built had they not had granite and stone quarries available! How different an expression would have distinguished Greek art had Greece been an alluvial country affording bricks only instead of stone and marble! How differently would the Romans have built had they been acquainted with the economic uses of wrought and cast iron!

Were I disposed to encourage the search after *a new style* (a search which I am very far indeed from encouraging you to prosecute), I would say to you, seek it in the application of some *material*, or in the invention of some new *system of construction*; for truly it is in our own art as it is in the fabric of the human body; the general aspect of every animal depends for its varieties of form far more on the structure of the skeleton than on the superficial integuments with which its exterior is clothed.

I revert now to the state of our art, when the arch had acquired that influence which it never afterwards ceased to exercise.

I suppose that we may regard the Tabularium, on the Capitoline Hill, as the earliest, well authenticated, example of a regular *arcade*. An inscription exists to this day which tell us that it was built by Q. Luctatius Catulus, who was consul, A.U.C. 676, a hundred years therefore before our era.

After this date examples become much more frequent. I believe I am justified in saying that the earliest surviving example of the superposition of one arcade upon another is the Theatre of Marcellus, built by Augustus. There was but a step between this system of construction and that which was perfected in that stupendous pile, the Colosseum.

I have, in a lecture which I had the honour to deliver last year, pointed out the deep and durable effect on architectural design that must have been produced on all subsequent time by that marvel of art. When we remember that this building was the great centre of attraction in the pleasure-loving capital of the world; the eager resort of a countless population, whose cry was ever "*Panem et circenses!*" such a building would almost necessarily be the object, *first*, of admiration, and then of imitation. Hence we find the arcaded corridors of the Colosseum repeated in various

parts of the wide-spread Roman empire, thus exercising a powerful influence on the architecture of the whole civilized world. The accomplished artists of Rome were not slow to perceive that, besides the opportunities for rich ornamentation which this union of the arched and columnar principle afforded, and the pleasing variety of effect obtained by this combination of straight and curved forms, there were practical benefits resulting from it: the far wider span that could be given to the *arches* than it would be possible to give to an *intercolumniation*, was an important advantage in a great public building resorted to by the teeming population of Rome; whilst the three-quarter columns, bonded in as they were, so as to form an integral part of the piers of the arcade, became a source of great additional stability to the structure, acting, in truth, exactly as the buttresses in Mediæval work.

It would be out of place *here* to dwell upon the magnificent masonry of this wonderful building; but I would remark that the Roman builders, however deficient they may have been in the higher efforts of genius, were certainly most remarkable for uniting a strong artistic feeling with a knowledge of construction that might well put to shame the puny efforts of modern masons, whose ingenuity generally exhausts itself on ignoble endeavours to pare down their work to the minimum of substance, and to ascertain what is the greatest tenuity that may be given to their walls so that they may just stand—and no more. Certainly, had such penurious calculations influenced the great masters of Roman art, we should not now, at the end of eighteen centuries, be contemplating the gigantic remains that still survive to surprise and instruct us.

It was said by one of the most eminent engineers of the last century, Mr. Mylne, that he derived more practical benefit from the careful study of the masonry of ancient Rome than from any other professional object of his attention on the Continent. With reference, however, to the combination of arches and columns, I am not prepared altogether to defend the union of these two modes of support on the ground of any great propriety there may be in that union. The arches, or the columns, ought perhaps each to suffice for the purpose of carrying the superincumbent weight, without the aid of the other. In the case, for example, of the triumphal arch of Severus at Rome, and the numerous similar structures to which the patriotism of the Romans, and their love of military glory, gave birth, the coupled pillars on either side of the arch seem superadded for no purpose whatever beyond mere embellishment. Critics may differ as to whether that is a sufficient justification. It is a wide question how far an architect is to be permitted to avail himself of forms of no real utility for the sake of their æsthetic merits. I have already, on a former occasion, sufficiently discussed that question; and the result which I,—perhaps I may say, *we*,—came to was, that pure and excellent as is the principle that utility should be at the foundation of all architectural design, a too literal acceptance of that principle would lead to the abandonment of much of that pleasure which we derive from the contemplation of abstract beauty: it would deprive the pinnacle of its crockets and the frieze of its foliage. Such considerations incline me to justify the ancient artists in that pleasing combination of arches and columns which became afterwards so rich a source of beauty, when the cinque-centists came to found on the antique type their own essentially new style.

The arch having now become the form most favoured by Roman architects, we find it entering into the construction of all their most important works, both public and private. An arcaded cloister forms the most marked feature in the beautiful building at Tivoli, known as Mæcenas's villa, but attributed by some antiquaries to a date somewhat later than the lifetime of that patron of art. Arches also form the essential feature of the Temple of Peace, the magnitude of which arches may be understood by considering that the span of each arch or vault is about the width of Regent-street, and is in height up to the crown of the vault something more than the height of the York column.

We have not time, were it expedient, to follow the history of this form through the period of the decadence: the palaces of Caracalla and Diocletian present many magnificent examples of it, and a peculiar character is given to the early Christian basilicas by its almost constant use. An arcade completely surrounded the multangular tomb of Theodoric. The architecture, indeed, of the Bassi Tempi is especially characterised by these arcades, although reduced, it is true, to very insignificant dimensions. The façades of perhaps all the churches of that period were usually covered with them; and it is curious to observe how direct the descent is from these arcaded, Romanesque façades down to the west fronts of our Chichester and Lichfield cathedrals. All art is generative. We begin by simply repeating what we have seen and learnt to admire or revere; but the active mind of man is not content to stop there: it goes on to vary and modify and amplify. New ideas will supervene; new resources of art arise: thus great changes are made, and wide departures suggest themselves, till the original type remains uneffaced, and the parent idea—the arcade, the dome, the spire—is handed down in a numerous and diversified progeny.

Hastening now on to the Early Renaissance, I do not call to mind any surviving building of that date wherein *columns*, if introduced at all, do not play a very subordinate part as compared with *arches*. It is true that Alberti, writing about the middle of the fifteenth century, does lay down some not very definite rules for the *Orders*, such as he found taught by Vitruvius, whose treatise, although then but little studied, was beginning to receive that attention which was afterwards even *too* lavishly bestowed upon it. Nevertheless, it is very certain that the early masters of the Revival sought for architectural effect, not from stately colonnades, but from variety of outline in their masses produced by the infinite diversity of graceful forms afforded by the arch.

If you examine the pictures and frescoes of that early period to which I advert, you will find the painters perpetually revelling in the graces of the arch. Arcades of infinite variety and originality occur in the works of P. Perugino, Alberti, Albert Durer, and others.

But the *architecture of painters* is a subject too pregnant and important to be treated on incidentally or slightly; and I shall, therefore, reserve that subject for a future occasion.

I have now detained you at perhaps more than sufficient length on the historical view of my subject; but all history, remember, is a treasury of useful lessons. The politician is ill prepared for his task of advising how a country is to be ruled if he be not thoroughly well informed how, under various circumstances and at former periods, other countries have been ruled, and with what results; and so the young architect will find himself unequal to cope with the difficulties, or to win in the contests which await him in his future professional career, unless he shall have learnt how his predecessors have contended with and overcome like difficulties. Reynolds goes so far as to predict that, "when the great masters of past times shall cease to be studied, the arts will no longer flourish, and we shall again relapse into barbarism."

It is an undoubted truth that the artist, whatever may be the branch of art he would cultivate, must take these retrospective, general views, if he desires to be well informed in his art. A man who is in search of the *right path* must needs scan well the country around him, far and wide, in order to find it.

My special purpose on this occasion is, as I have told you, to confine your attention to the subject of the *arcade*. I trust I may say, honestly and without risking the charge of conceit, that I feel somewhat of kin to enthusiasm on this subject. In the earlier days of my studies, when I first viewed the noble works which time has spared us on the Continent, nothing attracted a more eager attention, nothing impressed me more deeply, than the beauty of those arcades which, in endless variety, offer themselves to our admiration in that land of art, Italy. It is far from my purpose, or wish, to depreciate the beauty of columnar architecture: the cortile of St. Peter's and the façade of the Louvre are evidence of the noble effects attainable by a simple colonnade: yet it cannot, I think, be denied that the *arcade* has in many respect an advantage over the colonnade: there is more variety of outline in the former; a broader chiar'scuro; perhaps a greater scope for ornamentation; for whilst both alike may present cornices, friezes, and shafts, upon which ornament may be lavished to any extent, the arcade *alone* affords a peculiarly favourable field for the ornamentist in its springing stones, keystones, archivolts, and spandrils. But besides these purely *æsthetic* considerations, there is another point of view in which the arcade may be looked upon with favour. It is obvious that the arcade, and the vault, offer a system of construction which leaves the space they occupy freer, and more unencumbered than any other, not only because the use of the arch permits the points of support to be wider apart, but also because, as I think may be easily shown, the points of support themselves may, *cæteris paribus*, be made, in respect to their area or horizontal section, smaller in the case of an arcade than in that of a colonnade. The reason is this: when the whole height of the aperture, or series of apertures, in a wall is *given*, the length of the shafts which support an arcade will necessarily be less than their length when they are charged with a horizontal entablature, *by the radius of the arches supported*.

The *stability* of a pillar or shaft, or of any upright support, is, in the language of mathematics, *directly* as their diameter, or horizontal section, and *inversely* as their height or length. Therefore, in order to support any given pressure, whether it be that of an arch or of a horizontal entablature, the *less the height, the less* may be the area of the section of the pillars.

This is no scientific delusion, but an exact, certain, mathematical truth, a truth which may be recognised in the general adoption of the arch, whenever circumstances render it expedient to occupy as little space as possible by the supports. Thus it led to the substitution of arches instead of columns in the Christian Basilicas, for the internal supports of their roofs; and the recognition of this truth no doubt led to the ultimately universal adoption of arches instead of columns for the interior supports of Mediæval churches. It is true that the *wider* the *arch*, the *larger must be the section of the piers* which carry it; but then the diminished length (or height) of the piers compensates for this, and the result is that an equal burthen is borne by less bulky supports when arches are used instead of columns. I fear that in this disquisition about the size of piers I may have been led away into details somewhat too technical; forgetful that within these walls we are limited to the consideration of architecture as a *fine art;* but unfortunately, in architecture, science and art are so intimately blended, or rather so indissolubly connected, that it is sometimes apparently impossible to skim over the surface of one without dipping our wings slightly into the other.

One of the most beautiful applications of the arcade is in the *cloisters of the middle ages;* originating, I presume, in the impluvium, or, perhaps, in the crypto-porticus of the Roman villa. The cloistered court became, in very early Christian times, appropriated as the atrium or fore-court of the Basilica, an interesting example of which survives at the Basilica of S. Ambrogio, in Milan. This cloistered court, so well adapted to the solitary and contemplative habits of monastic life, soon became an essential feature in every monastery, and we find even that *two* such secluded courts were not unusual. At first, probably, mere sheds of wooden construction, they ultimately became objects on which the builders of old loved to display all their power. Even as early as the tenth century, a portion of a cloister which exists at Puys de Vélay, in France, shows much elaborate masonry. The Campo Santo, of Pisa, is a highly interesting and very well preserved example of an arcuated cloister of the thirteenth century, which, although now open, appears formerly to have been glazed, no doubt with a view to protect the frescoes and monuments with which the interior was so richly decorated.

This glazing was a luxury unknown in earlier cloisters, and seems to have been a natural consequence of the growth of tracery.

I must not, however, dwell on this subject of cloisters: the examples are too numerous to render it expedient for me to present them to your notice here. Yet they well deserve your careful study, as being one among the most beautiful of the applications of this principle of construction.

In *civil* architecture, the builders of the Middle Ages were not slow to avail themselves of the arcade. The front of the doge's palace towards the piazzetta, Venice, presents an example of singular beauty; and suggested, probably, those smaller glazed arcades which became one of the favourite modes of enriching the façades of the palazzi in that city during the fourteenth and fifteenth centuries. To the former century is due, also, the noble arcade so well known as the Loggia dei Lanzi, in the principal piazza in Florence. This most original work marks an epoch in the history of our art; for we recognize in it the commencement of the change which took place so early in Italy, and which heralded the return to the ancient types. Michelangelo is reported by Vasari to have so enthusiastically admired this work by Andrea Orgagna that, when a general improvement of the piazza in which it stands was contemplated, he declared that the most perfect mode of ornamenting it that he could devise would

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be to continue this noble arcade around all the four sides of the square; and I think there can be no doubt that, had Michelangelo's conception been realized, one of the most magnificent architectural scenes in the world would have been the result. Some idea of the grandeur of this arcade may be formed by picturing to the mind an arcade considerably higher than Somerset House, consisting of a single range of arches 45 feet high from the pavement to the crown of the arch.

The Campo Santos at Ferrara, Bologna, and Milan, are examples of arcades very remarkable for their extent; and, in the case of the latter example, especially worthy of study as an evidence of the applicability of terra-cotta to the purposes of architectural ornamentation. It is in the style of the earliest Renaissance, and overladen with a superabundance of the most intricate decoration, executed wholely in brickwork, and designed in a quaint and original, but very effective manner.

Those only who have endeavoured to execute buildings with bricks of moulded terra-cotta can fully appreciate the masterly dexterity with which this most elaborate piece of work is carried out; a dexterity which is immeasurably beyond even the remotest *conception* of a London bricklayer.

When the practical difficulty of moulding and casting in mere brick earth minute enrichments with the sharpness and force we here see,—the difficulty, too, of building up and bonding together this multitude of details so closely and solidly that at the end of four hundred years the work should still stand in excellent preservation—with these facts before us, we are constrained to admit that our artisans have a very great deal to learn before they can come up to the level of their ancestors.

The other two cemeteries I have named are also noble arcaded areas, offering valuable suggestions for similar structures in this country; inasmuch as these covered avenues, while they afford a well-protected walk, offer most favourable positions for sculpture and for inscribed memorials.

A uniform, symmetrical arrangement of this nature would surely be better than the chaotic confusion of heterogeneous monuments which our open cemeteries usually present.

It would occupy a great deal too much of our time were I to attempt to enumerate even the most conspicuous examples of this popular and pleasing feature, the *arcade*. Italy abounds in them. The city of Bologna, more than any other city in Europe, or perhaps in the world, is rendered remarkable by them: you may traverse that large city in most directions wholly under their cover; but perhaps one of the most singular arcades in existence is that which extends for upwards of two miles from one of the city gates up to a church built on the summit of a height overlooking the city. This arcade was built by the inhabitants in honour of the church to which it leads, and for the public use and benefit, at their own cost, each citizen contributing an arch.

I am tempted here to ask why so remarkable an instance of the benefit resulting from a combined action in such matters should not suggest the erection of some similar arcade encompassing, or traversing, one of our own parks? Such a cloister would be a work of signal public utility in a climate such as ours.

Now, with regard to the relative proportions which should be given to an arcade, it does not appear to me that any rule can be laid down rigorously on the subject. Much depends, perhaps I might say *all* must depend, on the circumstances of each case. Independently of every consideration of *style*, the *nature* and *position* of the building would have to be consulted before we could determine whether an elegant lightness or a grandiose stability should characterize it; and this applies equally to the arches themselves, and to the piers from which they spring.

The utmost diversity prevails among even the finest examples; and, in truth, it is the facility with which the arcade lends itself to every purpose of our art which is one of the good qualities especially recommending it to the architect. We have had to vary the proportions of the pier to the arch, and we have at our command the widest extremes of effect. There are *pedants* in all pursuits, whether in letters or in art; and our art has, perhaps, more than the sister arts, been the victim of those narrow views which pedantry engenders. We have had our rules laid down for us with a precision that would lead us to infer that there must be some arithmetical gauge by which we may test all the most subtle questions of taste in art. Thus Milizia determines for us that an arch 12 modules wide should never be *less* than 23 modules, nor *more* than 2 modules in height; and with respect to the piers which support them, that their width should never be more than one-half nor less than two-fifths of the span of the arch. There perhaps may be some use in arbitrary or empirical rules of this nature as helps to the student, but they must ever be regarded as mere rough approximations, subject to so many modifications according to circumstances as to render such rules of very limited application. For instance, some of the most pleasing examples of Italian arcades that I can call to mind have their arches springing from single or coupled columns. It is obvious that Milizia's rules are wholly inapplicable in such cases: it is also obvious that, in determining the proportion that the arch and pier should bear towards each other, it is most important to regard the weight and bulk of the superstructure. To an arcade that has but its own weight to carry, a degree of lightness and airiness may be given which would be quite inappropriate when a heavy building surmounts the arcade.

It would be in vain to argue that by the use of marble, or granite, or, perhaps, iron, the slenderest supports may be rendered adequate to bear even the loftiest and heaviest structures: the *prejudices* of the eye must be consulted if we would wish to please it.

There is but one other detail to which I need now refer; namely, the manner in which the arch is made to bear upon the piers or pillars which receive it. This appears always to have been regarded as a difficulty, demanding the exercise of more or less ingenuity, especially when the arches sprang from columns. The earliest idea was to make the arches spring from imposts consisting of so many fractional parts of the ordinary continuous entablature of a columnar order. This is, of course, a very easy contrivance, inasmuch as it involves little effort: the portion of the entablature between each column had but to be removed and an arch substituted. Yet this easy arrangement had its obvious objections: a *stilted, unstable* effect is produced, and the cornice returning round over each column has a top-heavy appearance: in fact, it converts this part of the entablature into a sort of overloaded capital of clumsy shape.

This defect became effectually remedied by the total omission of the entablature and by making the arch spring directly from the capital of the column. Examples of this occur so early as Diocletian's Palace, in Dalmatia; and many other instances of the period of the Bassi Tempi. But the incongruity of the square archivolt resting on the circular shaft became soon apparent to the Early Mediæval masons, who struggled to invent some intermediate course. Hence arose the use of those blocks which we see on the capitals of columns in the Lombardic and Byzantine schools. These rude devices are not without merit and originality, and were, at all events, good and sensible pieces of masonic construction. All, however, were abandoned when the facile hand of the Gothic freemason had learnt to overcome the difficulty by a variety of more or less effective contrivances.

At length all further embarrassment was removed by the total omission of an impost or capital, and the archivolt mouldings were continued down the vertical sides, uninterrupted by any impost whatever, to mark the springing of the curve.

I have addressed to you these somewhat miscellaneous and imperfect notices of the arcade, its history and its construction, and its æsthetic merits, with a view to invite your attention to what I consider one of the most fruitful sources of beauty that our art commands. I would have you study with diligence and with becoming respect the glorious examples that have been bequeathed to us by our predecessors; for I am not of those who seek to despise or repudiate the authority of *precedent*, and who thus set at nought the experience of ages. The self-satisfied who find their vanity gratified by vaunting the superiority of the present over the past—of their own pre-eminence over their forefathers — are precisely the men who do most to check improvement and impede real progress. Yet I would, with equal earnestness, deprecate that blind and unreasoning *subjection* to precedent—that blank and ignoble perverseness that raises up any given style or any given period into an object of idolatrous worship, at the foot of which every votary of art must bend the knee and prostrate his own judgment. All such narrow exclusiveness enfeebles and impoverishes the mind, leading to direct imitation and to a disregard or forgetfulness of the general principles of our art.

It should never be overlooked that, in æsthetic as in other matters, we are reasoning creatures, bound to exercise the judgment with which we are endowed, weak and faulty as it may be, prone to error as it certainly is; yet such as it is we are bound to listen to the promptings of our *reason*, for such in truth is the sole ground on which we can claim superiority over all other of God's creatures. We are taught by the highest authority that has been revealed to us for our guidance, that we should "Prove all things, and hold fast by that which is good." This great dictum was uttered for our spiritual guidance, but it may, I trust, without irreverence, be regarded as teaching *artists* also a lesson. It tells us to make ourselves as thoroughly acquainted as we can be with all that the past has left for our admiration and instruction in art; and with our minds so edified we are to exercise the attributes of reason and judgment in selecting that which is true and good, and rejecting that which, whatever its merits, may appear to us as having become unsuitable or unequal to meet the requirements of the present time.

This doctrine may be stigmatised as eclectic or latitudinarian, and as encouragement to an indulgence in all manner of fantastic excesses. Yet I would reply that into whatever amount of error our ineffectual struggles may lead us, such error would be the result, *not* of any unsoundness in the doctrine, but of our own weak judgment and of our own insufficient intelligence.

Reason and good taste can never be really at variance. If we do *not* take reason for our guidance, to what pyx or star are we to resort for direction? What test in our art have we, if it be not our sense of what is reasonable? Is *tradition* to be the test? Can abstract *science* furnish us with it? Shall *fancy* supply us with the mete-wand with which we are to measure taste in art? Vainly shall we seek to place reliance on any of these insufficient guides.

It appears to me that architects have no alternative but to choose between an entire, blind, and exclusive reliance on precedent and authority; or we must take the dictates of reason as our guide, and endeavour to shape our course under her influence.

Let us then hold fast to that which presents itself to our minds as good and right, allowing no superstitious prejudice to warp our judgment, be it *Greek* or *Gothic;* and I think we may rest assured that such a course would afford us the best chance of ultimately, arriving—it may be after a long purgatorial period of folly and excess, yet still ultimately, arriving—at a sound, consistent, and original style, worthy of the genius and civilization of the nineteenth century.

In making these remarks in vindication of our right, perhaps I should say,—in enforcement of our duty, to exercise, in the best way we can, that reason which has been beneficently implanted in our minds,—I am very anxious not to be misunderstood as undervaluing that other important duty of studying the works of our great predecessors. I have already urged this duty on you: let me do so again emphatically and with all earnestness.

Has not the text I have ventured to quote told us to "Prove *all* things?" Make yourselves, then I repeat it, intimately acquainted, not in a desultory, superficial way, but intimately, critically and studiously, with all that our forefathers have done. They have handed down to us treasures which, to disregard, would be to deprive ourselves of the means of acquiring their wealth. It is our great Reynolds who says, with true Johnsonian force, that "Bacon became a great reasoner by first entering into and making himself master of the thoughts of other men."

So also, I sincerely believe that the best possible foundation of originality in design, as much in that art with which I am alone conversant as in the two kindred arts so closely allied to it, is an intimate knowledge of the works of others.

Having in these few words touched upon the subject of the education of an architect, I am tempted in closing this my last lecture of the present season, to pursue the subject a few minutes longer.

The nature and extent of the professional education which it behoves an architect to acquire who aims at taking a place among the forward rank of his fellow labourers, form a large and important question, which has of late excited a deep interest in the profession, and has occupied much of the attention of its elder members; and I cannot doubt that on the result of their deliberations may much depend the good or evil destiny of the profession.

But this is not a proper place for dwelling on that momentous question. I must not forget that I am addressing a body of which but a very small portion are architects; and it is therefore necessary that my remarks should apply exclusively to my art in its relation to the sister arts; keeping clear

of those technical inquiries with which our brethren of the other branches of art cannot be expected to sympathize. There is, however, one lesson of which a pretty long experience has taught me the high importance, and which applies with equal force to all the arts of design: I mean the absolute necessity of acquiring the power to *draw* well.

In painting there is, perhaps, no point so emphatically dwelt upon by those who have a right to guide us, as the necessity of acquiring this power; and, in the *sculptor's* art, to draw well must necessarily be of at least equal importance; for in that art *form* may truly be regarded as of paramount consideration.

But I venture to aver that, whatever may be urged on this point by the painter and sculptor, will apply with especial force to architecture.

Truthful representation and a delicate appreciation of form are so essentially a part of an architect's education, that I know of no acquirement in the curriculum of his studies that can take precedence of the power of *drawing*.

I am tempted here to quote the words (*never, I believe, yet quoted*) of perhaps the very highest authority that could be adduced on such a point.

In the very valuable collection of drawings by Michelangelo in the British Museum is an architectural sketch upon a loose sheet of paper, preserved from destruction by the reverence of his zealous scholars, and now stored amongst the most highly-valued of our art-treasures. Upon the margin of this sketch are written, in the well-known handwriting of the great master himself, these words: — "*Desegna, Antonio, — desegna, Antonio, — desegna, e non perd' tempo.*" The Antonio to whom these admonitory words were addressed was probably Antonio Mini, who was a favourite pupil of Michelangelo. Such, at least, has been suggested to me by Mr. Carpenter, in whose able hands these sketches are deposited. The emphatic repetition of the word "*desegna*" unmistakably and forcibly expresses the importance attached by Michelangelo to the necessity of *drawing* well, and it points out with singular force the great master's opinion that unremitting application in the drawing-school is of paramount importance to the artist.

Such application is attended, I need scarcely remark, by other beneficial results besides mere facility of *hand* in the use of the pencil. It is also excellent practice to the *eye*. The power of observing *closely*, and therefore *correctly* and *profitably*, can alone be acquired by those whose eyes are trained by a constant exercise in drawing; and we may add, as the converse of that truth, that he only can draw with correctness who has educated his eyes by constant habit of observation.

In the painter's art, I apprehend that the best safeguard against mannerism is this habitual exercise of the power to see and to represent objects as they really are; and it is almost superfluous to say that in the art of architecture the best security for originality of design is to be found in the acquirement of a full command over the pencil, by which the designer is saved from the tendency to repeat commonplace forms and to follow in a beaten track, and also from the risk of falling into an indulgence in architectural platitudes. My urgent advice, therefore, to all young architects, is that, while the *pen* may well be laid aside as an instrument of very doubtful value in your æsthetic education, and whilst the *tongue* may well be spared its labours, inasmuch as a wonderful volubility of that organ may be found to co-exist with a very slender store of solid knowledge; let your pencil, in the mean time, be ever in your hands; and remember Michelangelo's advice to his favourite pupil, "*Desegna, Antonio; desegna, Antonio!*"

LONDON RAILWAYS.

THE necessity for widening the Metropolitan line between King's-cross and Victoria-street, will present itself, we apprehend, very speedily. A similar necessity must also be felt soon, in the case of the line from the Victoria (Pimlico) Station. The traffic has increased beyond all expectation; and trains of the Great Western Railway will ere long have to be provided for. Indeed, two of the companies at present using the station, have Bills in Parliament for widening the line and increasing the station accommodation. For the northern lines, our readers know, a bridge is being built across the Thames near Cremorne Gardens.

The London, Chatham, and Dover Company have not fixed upon the exact site for a station in the City. Indeed it would appear that this Company propose to bring their line only to Earl-street; and to leave the station, and the line connecting theirs with the Metropolitan Railway, to be constructed by a distinct company. Meanwhile they are seeking to have the time allowed for the completion of their line, extended to the 1st of August, 1867. They have already a line in operation from the Elephant and Castle, through Camberwell, to Herne Hill, and one from the Victoria Station through Clapham and Brixton to the same place. There is a connecting line between these two; and passengers may travel from the Victoria Station to the Elephant and Castle, and eventually, crossing the Thames to the station in or near Farringdon-street, or still further in a northerly direction, in fact to the north and west of England; or may travel in the reverse direction. The two lines, or branches, one from the City and the other from Victoria-street, unite at Herne Hill as already mentioned; and the main line to Dover will continue with a station at the north end of the Crystal Palace, and the one at Beckenham. The Junction between the London, Chatham, and Dover Railway and the Metropolitan, as well as the station, and a connecting line to the new Smithfield Market, form the subject of the Ludgate Station and Junction Railways Bill, promoted by a distinct company. Ludgate-hill is to be spanned by a girder bridge, at a height of 18 feet. Every one seems to regret the prospect of the unmitigated ugliness of such a structure interfering with the view of St. Paul's,—as it is to be feared also may the Thames Bridge with the view from the new Blackfriars Bridge,—yet no one seems to have the will or power to control the proceeding now, further than the City propose in getting power to require that the span of the Ludgate-hill Bridge shall be sufficient to permit of a widening of the street at some future time. The total area scheduled is about 17¼ acres; and it is probable that a large portion of the property at the western end of Ludgate-hill will be taken down.

According to Mr. Heywood's Report (lately presented to the Commissioners of Sewers for the City), from which some of these particulars are taken, the whole area bounded by Eldon-street on the north, London-wall south, Finsbury-pavement west, and Bloomfield-street east, and therefore including Finsbury-circus, and the London institution (but excluding four chapels, and an eye-infirmary), is to be taken for the new Metropolitan Station of the Great Eastern Railway. We have already spoken of the general want of harmony between such undertakings as those of the railways in the metropolis, and the arrangement of the streets. The railways about Finsbury are an illustration of the defective system. The Metropolitan Railway coming to the east side of Finsbury-pavement, will, according to Mr. Heywood, have its level of rails 18 feet 6 inches below the street-level; whilst the Great Eastern Extension will have its level 19 feet above the street. The break, and the ascent or descent of seventy or eighty steps, are very properly commented upon as matters deserving the serious consideration of the City authorities, of the two companies mentioned, and others, and of the Government. The scheme of the Great Eastern Company as it was in 1861, comprised a junction with the Metropolitan Railway; whilst a general station on the site of the circus, was to serve for both railways; and no reason is apparent for the changed intention of the Great Eastern Company. According to Mr. Bazalgette's Report to the Board of Works, this railway will join the North London near Dalston-lane, and the Enfield and Edmonton Railway at Edmonton.

The City extension of the North London Railway, which was authorised in 1860, will, it seems, have its terminus in Liverpool-street, Bishopsgate-street.

It is difficult to make an accurate enumeration of the schemes, or to lay down on the map of London the proposed works and the sites of stations. The lines about Wandsworth, appear very complicated without such a guide. Mr. Stanford's advertised map, if posted up from time to time, may be of service; but the want of good planning which will become a feature of the area of London, will deduct much from usefulness of the means of communication provided. Besides the lines mentioned, however, there are several others. The Charing-cross Railway, which will be connected with the South-Eastern line and the South-Western, will include a line from Charing-cross to Cannon-street,—a more direct route than, without looking to the map, might be supposed. The second bridge will be commenced immediately. The line between Charing-cross and London Bridge, is expected to be completed this summer.

Amongst the proposed lines which would run at a lower level than that of the streets, are the Albert Station and Mid-London Railway, the Regent-circus Railway; the Metropolitan, Tottenham, and Hampstead Railway; and the Kensington, Knightsbridge, and Metropolitan Junction Railway, mentioned in our notice of the Metropolitan; a line passing through the Thames Tunnel; and the Midland Extension to London; but there may be some others. Of those named, the first and last have lately failed to comply with the standing orders. The Regent-circus Railway is proposed to commence at the Great Northern Terminus, and to extend to Great Windmill-street, Haymarket. It would cross over the Metropolitan Railway, the Euston-road being raised 11 feet, with an inclination of 1 in 30. The Hammersmith and City Railway will be connected with the Great Western line near to Portobello-lane, Notting Hill; and the other schemes include those of the Barnes, Hammersmith, and Kensington Railway; a line from the Blackwall Railway to the London Docks; one between Brixton and Peckam in connexion with the London, Chatham, and Dover; a Greenwich and Woolwich line; and the South London, Greenwich, and Woolwich Railway. The London and Brighton Company have lately opened their new line from Balham to Croydon; and are, we hear, about to commence another branch which will pass in the direction of South Norwood, across the country which lies between the first-named branch and the site of the Beulah Spa. Their station at Thornton-heath, by Collier's Water, has been established much in advance of the requirements; but if there are few houses now, there is most extensive preparation for them by the formation of roads. Indeed, in two or three years there will be no break of houses between the Crystal Palace district and Croydon.

The bridges proposed, taking in several that are for road traffic, are very numerous. We hope that the majority of them will be less unsightly than the Charing-cross Railway and the Lambeth Suspension Bridges. One bridge, a high-level, and suspension, would be east of the Tower. There would be others, as opposite St. Paul's; the Temple Pier; Cheyne-walk, Chelsea; Wandsworth, and several places above the metropolitan district. Thus, with the embankment on both sides the river, the new street to the Mansion House, the greater convenience of the steam-boat communication, by means of landing and embarking places which will be in connexion with the bridges; and the footways similar to those proposed for the Charing-cross Bridge, which may be added in other cases; improvement in metropolitan communications is likely to be realized sooner, and even more effectually, than we dared to hope for on occasions when we have treated the subject in its relations with the provision of healthfully-planned and situate places of residence, and with ameliorated condition generally of those who have to toil in the, to say the least, sombre, dirty, and mentally-depressing atmosphere of London.

The appropriation of open spaces like Finsbury-circus, however, will be a serious evil. Judging from Mr. Cowper's reply to a question by Captain Jervis, in the House of Commons, there are no adequate means of preventing such instances of movement in the reverse direction to improvement of the metropolis. We are, therefore, glad to see that Mr. Tite is urging upon the Government the institution of an inquiry into the nature of the various projects.

ROYAL ACADEMY LECTURES ON SCULPTURE.

PROFESSOR WESTMACOTT, in his second lecture, observed that though his last concluded with a somewhat unsatisfactory view of the prospects of sculpture, he endeavoured to show that its return to a healthier condition was by no means impossible or to be despaired of. He had with pleasure referred to the executive power exhibited in the present day; but he had felt it necessary to point out that the present art-impulse in England was calculated to lower the character of sculpture as an art of lofty purpose whose expression should be the highest class of form. But, he added, there was no reason why, if it could be practised on pure principles in its mode of presentation, and with choice of appropriate subjects, having regard to the speciality of this art, sculpture should not in modern times hold an honourable place even when compared with the best schools. This was the purpose of explaining to the younger part of his hearers the system of instruction offered by the Academy; that while the student was acquiring the mere mechanical parts of his art, he should also have his intelligence directed to the principles which should guide the sculptor's practice.

The present lecture was occupied with considerations of a more strictly practical nature. The subject was "Form,"—the crowning object of the sculptor's art. True sculpture can only represent by form. All other means employed by a sculptor to produce the impression desired are foreign to the genius and essence of this art. They usually fall into the category of trick; and such expedients, while they are unworthy the true artist, also have the effect of lowering the character of sculpture.

Thus limited in its means, it becomes very important to inquire in what manner this confined power should be applied.

It may be assumed that the form in which a work of sculpture is presented is understood to be only the *language* in which it is to make its address. The *object* the sculptor has in view is, through this language, to affect the heart and to move the feelings. The problem, then, is how to combine the expressive or sentimental in sculpture with the mode of representation that shall be at once true, and exhibit nature in her most perfect or beautiful aspect.

The highest class of form is found in man, or the human figure. It is, however, well known that from the accidents of life, this originally perfect organization is often subject to deterioration. The true *ideal* is, however, to be sought in the original uninjured condition of the work of the Creator; and the examples for the artist's guidance are to be drawn from this, and not from the less perfect exceptions. It may be asked—where is this ideal of perfection to be met with, it being admitted it is non-existent for general purposes in nature? It is to be found in those remains in which the observation, the sensitive feeling, and the acute appreciation of beauty of the greatest masters of form, the Greeks, have embodied it,—in the best sculpture of the best schools of this art. This is where the student is advised to look for it, and to study it,—not because it is Greek, but because the best Greek sculpture exhibits the most beautiful view of Nature. It took centuries for the development of this idea, but when once the Greeks perceived the value of their system, or rather principle, they strengthened its hold by referring its existence to a quasi-philosophical necessity, using the expression of the Good and the Beautiful as synonymous terms. Here, then, is the safest elementary school for the young sculptor's education.

The limited opportunity in our country for employing the entire nude forms in sculpture, affords no excuse to the student in this art for not making the human figure his most careful study. It should be the groundwork, the foundation of all his exertions. The best course for him is to accustom his eye to the best forms in the school of ancient statues. This will be the standard or gauge which will give tone to his feeling for form. These examples, as they are in fixed action, will be the safest objects for him to draw and model from. From these he may profitably proceed to study from living nature; and coming fresh from the discipline of the selected forms of the antique, he will soon see to what their excellence is owing, namely, to their being based on the only true foundation, nature; but nature without its commonplaces, its accidents, its deformities.

The study of the best works of the ancients leads to the recognition of the conditions necessary for that great result which we call the Beautiful in art. First, it accustoms the eye to its physical qualities, and the mind then by degrees becomes filled with the appreciation of its essential elements, as truthfulness of representation, correct form, fitness, harmony of parts with respect to the whole, and the agreeable flow of lines. The canon of proportion of Polycletus was referred to, with reference to this important condition of beauty and harmony; but, though such formulas have their suggestive value, the student was cautioned against supposing fine sculpture could be produced merely by the laws of the rule and compasses.

Some of the most remarkable statues of antiquity were reviewed for the purpose of showing the students in what their excellence consists; and at the same time the Professor pointed out how striking was the variety of form in all these, as it was required to express particular character; the types of Apollo, Hercules, Mercury, Bacchus, Cupid, and others, being all perfect of their kind, but at the same time differing widely from one another in their respective character of form. It was then shown that the standard of a high ideal among the ancients by no means excluded the most careful attention to natural details; provided only that their use was kept within the limits proper to insure the greatest amount of beauty. This was instanced in some of the sculpture of the Parthenon, now in the British Museum, especially in the statues of Theseus and Ilyssus. The students were advised to compare these with the Discobolus of Myron, the Dying Gladiator, the statue called the Fighting Gladiator, and other works, as instances of inferior treatment in this particular, notwithstanding their peculiar excellence in other respects.

Some works of very great merit by the eminent sculptors of the Italian schools, show the want of that just application of natural details and peculiarities in which the Greeks were such great masters. Michelangelo probably was the most learned designer of the human figure who has lived. His productions strike all judges of art by the energy of character and fearless dealing with form exhibited in them. Yet the effect of this great sculptor's works is admitted to be injured by the too ostentatious display of anatomical knowledge. This never occurs in the best ancient examples. In them the harmony of the whole is alone thought of as an end. The means are never forced into prominence.

A school of Realists would pretend that the mere conscientious copying of a natural object is, in itself, the perfection of art. And so doubtless it is, of mechanical art,—the art of copying. But such art would as often perpetuate deformity as beauty. The object of the sculptor being to express ideas and awaken sentiment by means of form, it cannot be reasonable, or a just homage to the author of perfection, to prefer imperfect form, the result of accident, for the purpose. There may be beauty in a very ordinary, or even ugly face; but this will be beauty of expression; and the beautiful that is there discoverable depends upon totally different conditions to those under consideration. In the sculptor's work, beauty of expression must not be distinct from beauty of form. His speciality is Form. He must not lose sight of that fact; and when Form is proposed to him for his study the very highest and best is intended. There will be sufficient room for him still to show the value of a close study of nature in his works; indeed, without this they will fail to make a lasting impression; but the sculptor must carefully restrain the impulse to carry this too far, and thus to injure the effect and force of the whole by too minute a rendering of parts, and especially of such details as are below the highest standard of beauty.

Some remarks were made upon the treatment of portrait and monumental works in which the taste for particular and minute accidents has often led the sculptor into the most egregious disregard of true art-principles. Thus, if a soldier were to be commemorated, it was not thought sufficient broadly to indicate the military character, but all the details of dress of the very battalion of the regiment to which he belonged, as buttons, buckles, and tassels, were to be correctly copied. But sculptors have gone even further than this; and if the hero, unfortunately, had lost any part of his person, he was to be sent down to posterity thus mutilated, perhaps with only one limb, or, of course, it might be without even one, if such accidents are to be perpetuated. Abuses such as these arise out of the present tendency to dwell upon littlenesses and unworthy details, to the injury of the broad principles which should govern the practice of all art, but which are essential to the success of sculpture. The lecture concluded with recommendations to the students as to the most profitable way of carrying out their studies in the schools of the antique and living model.

PROGRESS IN NEWCASTLE-ON-TYNE.

THE architectural works of this ancient borough are rapidly increasing. At the quay side, where a large amount of rotten and comparatively useless property was destroyed by the great fire and explosion some years ago, there have risen stately piles of buildings. At the north end of the High Level bridge, and near the Blackgate, which leads to the Castle Garth, an immense quantity of old and unwholesome property has been cleared away, and a large and substantial block of buildings, consisting of shops and offices, erected on the site; and we believe that it is intended to continue a uniform line past the west front of St. Nicholas's church to Collingwood-street. The change which will be effected by these alterations in this quarter of the town will be extraordinary. Thirty or forty years ago every building, with the exception of those in Collingwood and Mosely streets, had an ancient and dilapidated appearance. North of the church ran three streets, viz.—the Groat Market, so called from selling oatmeal there; the Middle-street, and the Cloth Market, the latter so named in consequence of an old fair for woollen cloths being held there. The whole of the two central blocks of building were removed some time ago, and the new town-hall is built on the spot. Formerly the view from the Groat Market, looking southwards towards the Norman keep of the castle, was very picturesque: in the foreground stood gabled and quaint-looking houses, and the varied materials of brokers' shops; then came the fine dark grey tower and beautiful lantern of St. Nicholas's church; and towards the Head of the Side the old buildings harmonized well with the massive and crumbling walls of the castle. Ere long, with the exception of the church, the Blackgate, it is to be hoped, and the castle, nearly all will be new which meets the eye here. In Westgate-street changes are also going forward. Immediately above St. John's church is a very good building for the Savings' Bank, and above it a large house with offices for Dr. Gibb. On the site of the old Grammar School, which should, in consequence of its interesting association, never have been removed, stands the monument of George Stephenson. The situation is not altogether satisfactory. Towards the Central Railway Station new and important buildings are springing up rapidly, while at the station itself a vigorous start has been made with the large portico, which will give to Mr. Dobson's noble building a very imposing appearance. Several churches and chapels, too, have been built.

The Tyne is being rapidly improved: what with the dredging and the effect of the sea piers at Tynemouth, ships of nearly twice the former dimensions can now come into the port. There is now on the bar a greater depth of water by 5 feet than there used to be; and all the way to Blaydon (about six miles above Newcastle Bridge) the dredging is being vigorously carried forward. It is hoped that when these labours have been continued a little longer, and the central arch of the old bridge has been removed, and a drawbridge substituted, ships of a considerable size will be able to sail to Blaydon. If this be successfully carried out, and we see no reason why it should not be done, important manufactories will speedily cover both sides of the Tyne in this direction.

In the days of the old corporation vast sums were raised by a duty upon coals, which, if properly applied, should have long since placed both the town and river in an excellent condition. Instead, year after year, shoals were allowed to collect; and in place of large ships being able to reach Blaydon, it was difficult for coal-keels and barges to make a voyage in this part of the river; and after an Ascension Day, when it was the duty of the Corporation to make a survey of their watery boundary, the mayor's and Corporation barges would be stranded for hours. In other parts of the Tyne the impediments were no less troublesome.

As regards sanitary matters, improvements are in progress; but this is slow work, and much requires to be done.

At present there is no cultivated public park; yet north of the town are immense tracts of very desolate-looking land. Part of this is called the Leazes, and is chiefly occupied as a pasture-place for the cows kept by the old *freemen*, who, before the passing of the Reform and Corporation Acts, had the entire management of the pecuniary and other affairs of the town. There is also the Town Moor, a much more extensive tract of land, part of which is used as the race-course.

The general appearance of the Town Moor is desolate in the extreme. There can be no doubt that, if thoroughly drained, both as regards the surface and deeper, and properly cultivated, this range would be very healthy, and the aspect of it would be soon materially changed. Persons in the town have, therefore, proposed to form part of the moor and the Leazes into an ornamental public park for the use of the inhabitants of the town, and to erect certain terraces along the north road, which skirts the margin of the Moor. This scheme is likely to be promoted by the corporation and a large proportion of the inhabitants, but the change will be most violently opposed by the freemen.

It is argued that the Town Moor and the Leazes are at the present time useful as a playground for the youth and children of the rapidly-increasing population. No one would more anxiously preserve useful open spaces than the writer, but in its present state all this land is little better than a waste; and even the cultivation of the district would—not to say anything as to the improvement in beauty—also be beneficial to the health of the town. Besides, there is no necessity for the introduction of a park-like appearance

preventing the usefulness of the land as a playground. An excellent example of this may be seen in the Victoria Park, in the east of London, where are some of the choicest ornamental grounds, and also plenty of space for pasture and all kinds of games.

Formerly there was to the east of Newcastle-upon-Tyne a beautiful walk, one part of which is called Pandon Dean, and the other the Ouse Burn. Here Bewick and his pupils, the Richardsons, Carmichael, Mole, and many other native artists, have studied with advantage. The former of these places, owing to railways, may be said to be amongst the things of the past; and, as regards the latter, its picturesque charms have been diminished by various recent and unsightly introductions. We are told, however, that Sir William Armstrong, of the great cannons, who has a residence at a place called Jesmond, on the banks of the Ouse Burn, has recently bought the whole of the estate from the authorities of Busy College, near Durham. The natural advantages of this spot are great, and exertions are being made to add to these by constructing, near the picturesque and rugged old water-mill, and elsewhere, water-falls, rustic bridges, and so on.

Lady Armstrong has also built upon the grounds a large banqueting-hall of fancy-coloured bricks. The inside walls are covered with coloured tiles. This hall is intended for tea-meetings, and other gatherings of Sir William's numerous workpeople, and the societies and schools of the town and neighbourhood.

With all these matters for congratulation, crimes have been committed which, notwithstanding the intellectual character of the bulk of the inhabitants, show that there is here, as in most other large manufacturing towns, an under-current of neglected ignorance. The children who are growing up in the poorer neighbourhoods should be looked after. It is not in Lancashire alone that the terrible war in America is felt: even in Newcastle, which depends so much for prosperity on our own resources, there are loud complaints. Nevertheless, it seems that there are large orders, amongst others, for stained glass from America, and that much is in preparation for India, Australia, and New Zealand, and for various parts of Great Britain. Since the days of the venerable Bede the Tyne has been famous for its glasswork for ecclesiastical purposes.

MEMORIALS AND MONUMENTS.

Royal Commission to Mr. Noel Paton, R.S.A. Mr. Paton has been commissioned by her Majesty, says the *Scotsman*, to paint a picture memorial of the Prince Consort—the Royal Family around their widowed mother,—all there but the inestimable, irreparable one—

"Whom never more shall they forget or see."

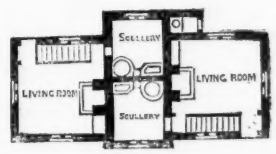
Bishop Hooper's Monument.—The statue of Bishop Hooper has been formally unveiled in Gloucester, in the presence of the mayor and corporation, the local clergy, and about 20,000 spectators. It cost 100 guineas, and was executed by Mr. Thornhill, of Dublin. It stands on a stone pedestal, surrounded by a canopy and a Gothic spire, which have been recently erected by the poorer inhabitants of Gloucester and its neighbourhood, at a cost of about 400*l.*, on the spot where the bishop was burnt. The proceedings of the day celebrated the 308th anniversary of Hooper's martyrdom.

The Yarborough Memorial.—A meeting of the subscribers is to be held at Brigg on the 29th instant, to consider the following recommendation of the committee:—"That the memorial should be a statue of the late earl, placed on an archway across the public highway where it enters the Blocklesby Park from the Brigg road, in the lordship of Kirmington;" or to consider any other memorial that may be proposed.

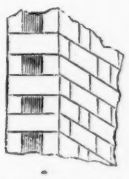
Statue of the Seventh Earl of Derby.—We understand that a movement is on foot for erecting in Bolton a statue to the memory of James, seventh Earl of Derby, decapitated in this town during the Commonwealth. The gentlemen who have taken the initiative have secured the services of Mr. Calder Marshall, who is preparing a model for inspection.

The Dalhousie Statue.—Mr. John Steell, R.S.A., of Edinburgh, has just completed a marble statue of the late Marquis of Dalhousie, which is to be placed in the Dalhousie Institute at Calcutta. It is a portrait statue in civilian costume, with a military cloak, and is rather above life size. There is no time, it seems, for exhibiting it in this country.

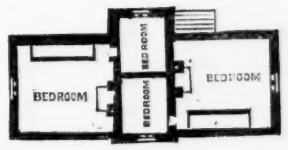
-LABOURERS' COTTAGES-



-GROUND-PLAN-



HOLLOW WALLS.



-BEDROOM-PLAN-

Mr. J. G. Stapelton, Jun., Architect.

LABOURERS' COTTAGES.

THE cottages illustrated by these engravings were erected in Kent for 180*l.* per pair.* The living-rooms are 14 feet by 12 feet. Contracts have been again taken for the erection of similar cottages in Sussex and other parts.

The walls are generally lime-whited internally, and not plastered. Mr. Stapelton, jun., was the architect.

NOTES ON THE PROPERTIES OF WOOD.

BY wood we understand that portion of a tree between the rind and the marrow, and we have to distinguish the heart from the sap wood. In hotter climates trees generally grow largest. A piece of heart wood is heavier and harder than a piece of sap wood, and a piece cut from near the root will be heavier and stronger than a piece cut from near the top.

The size to which some trees grow is astonishing. A few famous chesnut trees on Mount Etna measure from 60 to 80 feet in circumference: near Worms, in Germany, grows an elm tree (*Ulmus campestris*), called the Luther tree, 116 feet high and 35 feet in circumference: on the island of Teneriffe, a *dracæna* (dragon tree) is seen, 80 feet high with a diameter of 29 feet. Still larger than these are the mammoth trees (*Wellingtonia gigantea*), and the firs, found in America, some of which are reported to measure 400 feet in height and from 60 to 80 feet in circumference.

The inner structure of trees is the foundation of all the singularities of the woods. It is the same in most European and other trees. If we look with the assistance of a magnifying-glass at a cross section, we observe in the centre the marrow, next to it the heart wood, then the sap wood, the cambium, and the bark. From the marrow run out towards the rind thin lines, which are crossed by rings, taking the appearance of the cobweb of a spider. These rings indicate the age of a tree, one being in general added every year. Some trees live very long: for instance, the Adansonian, standing on the banks of the Senegal, is estimated to count nearly 6,000 years.

The yearly rings stand in close connexion with the development of the leaves: if we find them imperfect, it has been caused by the loss or the freezing of the branches. It might also have been effected by dryness, or by insects and larger animals who live upon and in the trees. Among the most destructive in the animal kingdom which attack trees are enumerated the cockchafer, horn-beetle, the barkscrab, the castor, hares, rabbits, squirrels, and deer.* In some instances it has been found that the August sap forms in the same year a second ring, by which the age of a larger tree becomes doubtful if it is estimated from its yearly rings. The formation of these rings is not so clearly marked in the wood which has grown in hotter climates. A strange appearance is caused by the unequal width of the rings, and in fact it is never that two of them are found alike, or at least very seldom. This feature is, however, of value, because one may judge by it upon the physical condition of the wood; and we will, therefore, examine this point more closely.

The fir, which grows on very dry marl, forms very narrow yearly rings; if on rich or damp marl, they are wide; and when on wet soil, they are again smaller. The common fir, on moor soil, has even smaller yearly rings than if on dry sand or marl. From this it is evident that too wet or too dry a soil is not suitable for the promotion of this tree.

The alder (*Betula alnus*), the willow (*Salix*), and partly, also, the ash tree (*Frascinus*), grow best on wet soil, and thrive but poorly when standing dry.

The healthy life of a tree requires a certain amount of light and constant fresh air, which are necessary, besides the nourishment which it derives through its roots from the soil. If a tree is transferred into a more suitable climate or richer soil, it will naturally improve in condition; but should any element be deficient, we shall notice no improvement, or the tree may improve in one way, such as increase in size, while it suffers on the other hand; for instance, loses in its specific weight. A pine with small yearly rings is of good quality, for we find each spring or summer ring surrounded with riper autumn wood, richly saturated with resin.

Towards the bark the autumn rings remain about the same thickness, whilst the softer portions are seen larger. A white fir-tree, twenty-five years old and situate in a tolerably suitable ground, may have a diameter of 3 inches or more, whilst another on dry ground will be but 1 inch thick. With the former the yearly rings will be 2·5 mill., and with the latter 0·16 mill. If we submit a cross section of each under the microscope, the former will appear like a net with

* See Vol. XIX. of *Builder*, page 630.

* A full description of these and their peculiar habits may be found in Ratzeburg's "Waldverderber."

large pores, while the second looks almost like one solid mass. This fact illustrates the cause for the many accidents which have not their immediate origin in the rotten or bad state of timbers. The greatest attention should be paid to the point in the selection of masts and spars in ship-building yards. The usual width of the rings in the fir, when young, is 2·4 mill., with a slight decrease towards the bark: the smallest rings are found in the Swedish and Russian firs: this may be ascribed to the short summer in those climates: however, they are found similar in more southern climates; therefore the same result is brought forward under different circumstances.

The leafwoods with large pores deserve special observation. Analogous but opposite to those made with the pines, we notice with them that, although the rings become smaller, yet the quantity or bulk of the porous spring wood does not diminish at the same ratio; therefore, a cubic inch must contain more mass the less we find pores in the same; or, in other words, the broader the yearly rings, so much greater will be the mass of the wood: the reason is, that the pores are considerably smaller on trees with broader yearly rings, and at the same time less numerous. The outer rings of trees are often found almost as porous as the root-wood. This is still more frequently the case with the branches of the trees. If we have, therefore, to select between two oaks, we shall choose the one with the broader yearly rings, because we shall have in a cubic foot of the same a larger quantity of wood than in the other.

Should it so happen that a whole forest produces trees with wide yearly rings, and another forest trees with small rings, then the question arises whether the former is caused by the wet condition of the soil; in which case the wood in the first will be more porous and loose than in the latter. We must, therefore, take into consideration the specific weight, as well as the broadness of the rings; and if we find both correspond, then we may conclude that the timber is sound. Wood that has rings of more than 6 mill. wide for a section of some inches, should not be used in building: it is only fit to be burned. Trees which have grown in marsh or clammy soil, along rivers, furnish bad timber.

If we dissect the stem of a tree throughout, and notice the yearly rings, we find many diversions, for the explanation of which we have to refer to the organization of the growth of the tree.

In pines we find more regularity in the width of the rings, from the centre towards the bark: this process depends much upon the position of the tree and the surrounding influences. With leafwoods we find a greater variety in the rings, but these as well as the pine have that same feature in common, that the rings increase towards the bark, and that close to the latter they decrease again. The number of branches influence the width of the rings in their position; and if a stem was cut through in its centre, we might then form the relative width of the rings in the various heights, and come to a conclusion as to the cause of their changes. It is necessary to remark, that the assertion that the rings are wider on the south side of a tree than those on the north, is devoid of all truth; still, excentric trees have broader rings on the projecting side than on the flat side; also inclined stems and branches show them smaller on the upper side. The bark is of importance to a tree: it acts as a protective band for the distribution of the sap, and is therefore necessary for the formation of the yearly rings. If the bark is damaged or split in a certain place, we observe that the next following ring increases considerably at this wound: an exception of this is the almond tree (*Amygdalus*), which bends hollow in the place where the bark has been damaged.

If we turn our attention to the condition of the woods, and take a cross section of the stem half an inch thick, it will hardly be possible to detect any difference between the younger and the older wood. If we take a stem of the same wood about as thick as an arm, the centre portion will appear dryer and may be called the ripe wood, while the outer portion is charged more with sap, and called sap-wood. With many timbers the heart-wood is of a deeper colour, or between the ripe wood and the sap-wood is a portion of different colour.

The ripe wood absorbs water less than the sap-wood: it has a greater durability, and it is not so easily decomposed as the latter.

In some trees the destruction commences with the ripening of the wood; for instance, the Canadian poplar (*Populus*) and the willows (*Salix*), which begin to darken in the centre; and by their smell they indicate their decay.

The sap-wood of hard wood trees is of little use: it never lasts for any period; and when used it only serves to introduce destructive organs into the better wood.

When trees arrive at a certain age they should be cut down, if it is intended that their wood should be of good and durable quality. If they are left growing the quantity of wood will certainly increase, but the quality will suffer.

The limits of the period when the trees are to be felled depends upon the development of their wood.

The colour is a prominent feature, not only with the various species, but also of the quality of the wood. If the tree is felled in a rainy or damp atmosphere, for instance, during a mild winter season, then the heart of the wood will retain its natural wet colour for a longer period. In a dry spring atmosphere the heart-wood dries sooner, although the sap-wood retains its moisture longer than the ripe wood of the stem: by this latter process the moisture evaporates and draws towards the bark, by which the sap-wood takes the darker colour of the ripe wood. The proper colours of the various woods are only fully developed after they have been exposed to the influence of the atmosphere for some time. The time when the timber is highest in colour is said to be during the period when the tree is in full bloom, which assertion has, however, not yet been fully verified.

If the colour of an oak is of one cast, it is a sign of its good condition; but it must be of the same shade in the ripe wood as well as in the various yearly rings: as the shades stand under the influence of action from without, a proper judgment upon the condition of the wood can only be given when the tree is forested. In some instances the scent of woods enables us to pass a judgment upon their condition. Persons who pass in the first spring month a number of old white poplar trees (*Populus alba*), will notice an obnoxious smell: this proceeds from the sap, which flows from the decayed interior to the outside. The pine wood will retain its natural smell for years. Leafwood trees have generally a sour smell, and it is reckoned that the stronger it is the healthier is the wood. Should this smell be faint we may judge that the tree is dying off.

The sap which circulates in the tree and promotes its life is composed in its main portion of oxygen, hydrogen, carbon, nitrogen, and sulphur. The same forms a considerable body in the green or fresh wood: it changes more or less in the quality of the wood, and the intimate study of its influences is of great technical importance. It has been said that the sap flows out of a tree after it is cut down. From experiments which have been made it resulted in this being the case with very few woods, and not with the majority: with most of them the moisture evaporates.

The quantity of sap changes very considerably during the season of the year. In elucidation of this a fine example is furnished to us by M. Duhamel de Monceau, and described in his work, "Exploitation des Bois." During the years 1732 and 1733 he felled each month eight oaks of equal age, and from the same spot. These were cut immediately into twenty-five pieces, each 3 feet long and 3 inches square (Paris measure), and he obtained the following results:—

340·718	pounds (Paris weight)	in December.
340·906	,, ,,	January.
328 031	,, ,,	February.
331·687	,, ,,	March.
311·875	,, ,,	April.
319·500	,, ,,	May.
297·312	,, ,,	June.
297·250	,, ,,	July.
314·469	,, ,,	August.
306·875	,, ,,	September.
328·906	,, ,,	October.
331·000	,, ,,	November.

(One pound Paris weight—1·0769 avoirdupoise.)

From these figures it appears that, during the months of December and January, the trees contain more sap than at any other period. It diminishes in October, November, February, and March; next in April, May, August, and September; and its quantity is least during the months of June and July.

From another experiment, made in 1737-38 with six stems of young oaks, it was ascertained that the lower portion of the trunk weighed (hydrostatically determined) of the December wood, 1·132; April wood, 1·016; July wood, 1·017.

This proves that there was most sap in the December wood. The difference between the April and July woods remains doubtful. The same pieces of wood were also weighed when dry, and, compared with the fresh weight, it gave the following result in lb. weight:—

	Green.	Dry.	Loss of Sap.
April wood	57·339	41·839	15·500
July wood	94·851	68·226	26·625
December wood	77·062	52·375	24·687

This shows that the quantity is most in December, and least in July and August. We must not overlook in these cases to take into consideration the influence of dry and wet seasons, by which the sap is materially affected. Contrary to the preceding experiments, the notion prevails that the quantity of sap in a tree is more in the spring than at any other season. Another author, Mr. Th. Hartig, found, after many experiments (which are fully described in Nordlinger's "Technical Properties of Woods") that, upon the average, with most woods the greatest moisture is in the trees during the months of January and February. He reckons it at 50·05 per cent. During the months of March and April some trees discharge through their bark a quantity of sap, from which one should believe that they were full of it, while only 47·5 per cent. is really in them. In May and June they hold 48·5 per cent.; in July, during which the yearly ring is formed, 50 per cent.; and in September, when the ring is fully developed, they contain 48 per cent.

The large amount of sap which is found in stems during the winter months diminishes towards the spring.

Heavy hard woods lose by drying about one-third of their original weight: lighter woods, poplars, alders, pines, &c., lose from one-third to one-half, which in some degree is dependent upon the soil where they were grown. The bark prevents the sap from running out of the stem; therefore, if pieces were taken from the same stem, some with and others without the bark on, it will be noticed that those without bark will discharge much quicker than the latter. Experiments have also proved that the weight of pieces with their bark on fluctuates, whilst the weight of barked wood steadily diminishes. The cause of this difference is most probably due to the hygroscopity of the bark to absorb humidity from the atmosphere.

Wood never loses all its sap: when it becomes air-dry it generally has about 20 per cent. of its weight. It is of importance to know how long various timbers of different dimensions and strengths will take to become air-dry; that is to say, how soon will they arrive at the medium weight which they always maintain, and to which they return whenever the influence of the atmosphere alters it.

Many mechanics require dry wood for their work, but it is not seldom that they use it before it is properly seasoned.

I have before alluded to several instances which affect the due seasoning of timber, and from these it is impossible to adopt a general rule, because in each place surrounding influences must be taken into consideration. Let me, however, refer to the cause of the warping of floor-planks, which has its reason,—that the air does not reach the lower side of the deal. It shows itself stronger where the plank has been planed at the top and the lower side has been left in its rough state, by which a larger quantity of moisture is discharged by the outer side, which causes the warping.

In exposing various woods to the action of water, it will be found that the younger stems are more subjected to its influence, because it absorbs more water than old wood. For hydraulic constructions, none but well-seasoned old hard woods should be used; and the sap wood should also be avoided, because it promotes the decay of the sound parts. The specific weight must next be taken into consideration.

Most of the woods swim in the water. The specific weight of wood is found by taking the dry weight, then thrown into water until quite saturated, after which it is weighed again. We must then weigh it under water. If we then divide with the difference of the second and third weights, which represent the weight of the water displaced by the wood, into the natural dry weight, we obtain the specific weight. This answers in general well enough, but it is not so correct as the process recommended by Mr. Marcus Bull. He justly observes that the wood is liable to swell in the water; and after having taken the dry weight he covered the piece of wood with a varnish having the exact density of the water. This varnish is composed of rosin having a density of 1·079, and wax having a density of 0·967. By this varnish the water cannot penetrate into the wood.

The solid matter of the wood divested of all cavities is heavier than water, and its density or weight, compared with that of water, varies, according to Rumford, from 1·46 to 1·53.

It is very difficult to give a general figure for the specific weight of any kind of wood. Pieces from the same tree produce different results, but the following figures give an average weight:—

Ironwood	1·210
Greenheart	1·200
Sabacue wood	1·100
Brazil wood	1·100
Ebony	1·080
Box	1·050
Medlar	0·950
Lilac or pipe wood	0·930
Oak	0·885
Beech	0·852
Ash	0·845
Yew	0·807
Elm	0·800
Apple	0·733
Fir	0·657
Lime	0·604
Cypress	0·598
Cedar	0·561
Poplar (silver)	0·529
Sassafras	0·482
Poplar (common)	0·383
Cork	0·240

The weight of water for the above is taken at 1 000.

Experience has shown that the time when trees are felled has much influence upon the condition of the wood. A trial was made in Germany with four pieces of oak, cut down in December, January, February, and March. A tin ring was fixed at one end of each of the four pieces: these rings were filled each with two quarts of water, and it proved that the piece of wood cut in December did not permit any water to pass through its pores.

The January wood, after forty-eight hours, passed a few drops; during the same time the entire quantity had run through the February wood; and the water had passed through the March wood in two hours and a half. This accounts for the fact that barrels, of which the wood was felled in February or March, will lose within a year as much as 8 quarts of water, whilst others lose hardly any at all. One should suppose that wood would absorb salt water more easily than fresh water, because of the pressure of the former being so much higher; still, this is not the case; and Mr. Duhamel has proved this by an experiment. He took two pieces of oak from the same plank, each weighing 5 pounds. During eleven months the one was exposed to sea water, and increased only by 2·141 lb. in weight, whilst the other put into fresh water increased by 4·141 lb. in weight.

Wood which lies in the atmosphere will constantly vary in weight, which depends upon the wet or dry season, and as the action is accordingly, we find the wood in its section, in a regular hygrometrical action.

If we attempt to abstract all moisture by heat from the wood, we must not forget that at the same time we destroy its nature; that is, the physical condition of the wood, by which it becomes very liable to break. Too much hot oil on wood has almost the same influence: by this it loses considerably in weight; and soon after the oil has been put on, the wood becomes brittle, and warps more easily than in its natural state.

The remainder of the sap, which is left in the pores of the timber, serves as a binding substance in the whole. It also prevents hygroscopical action provided the tree was cut at the proper time. The hygroscopicity is in constant action in the wood, and affects its body, shape, and weight, which in time leads to its dissolution.

This change is as much a chemical as a physical process, and is noticed in all woods. The weight of wood is of great importance to us because its hardness, resistance, and its heating power, as well as other valuable properties, are all more or less depending upon it. Let us, therefore, enter closer into this subject. In the first instance, we must consider that even wood which has been forested very light will become heavy when put for some time into water; but in such timbers the sap is already given to dissolution. If the fibre were the only substance in the wood, then the specific weight would depend upon the number of pores contained in its body: the pores are, however, filled with a substance such as rosin, die, &c. It comes to this: that young trees contain a great quantity of sap, whilst old trees have in the same proportion less; a volume of air being contained instead.

Suppose we leave the troublesome portion (the water) out of the question for a moment, and inquire into the reason which causes the heavier or lighter specific weight in dry wood.

The hardest and heaviest woods come from the hotter climates: the only exception is the pine which thrives considerably better and furnishes heavier timber when it has grown in colder regions or upon high mountains.

Trees grown on northern slopes furnish lighter timber than if grown on southern or western. In these remarks we have already noticed the fact that the soil has great influence upon the width of the yearly rings; and I also remarked that from this we are able to come to a conclusion in regard to the specific weight. We have since heard of a number of facts by which the connexion between the yearly rings and the specific weight is greatly modified; but, as an instance, I mention the fir and larch trees, which both are heaviest when their rings are smallest.

Another influence upon the specific weight is exercised by the resin and the die which are contained in the interior of the wood. On level dry ground or deep sandy soil we find the fir (*Pinus sylvestris*) beautifully red inside; in the same condition we find the leg-fir (*Pinus mughus*) on turf soil, where there is an abundance of water; but when we look at it on lias soil, it shows broad yearly rings and hardly any colour at all. The larch tree, again, in such soil developes itself well, with a rich colour. The cause for these appearances must therefore rest with the chemical condition of the soil and its effect upon the individuality of the fir. Oaks generally furnish good timber when grown slowly in dry ground, whilst those from wet soil appear comparatively spongy: similar results are obtained with other trees.*

JOS. JUSTEN.

A PREMIUM TO SCULPTORS.

THE ART-UNION OF LONDON.

IT should be known in artistic circles that the Art-Union of London has offered a premium of 600*l.* sterling for a group or single figure, in marble, to be competed for by life-size models in plaster; and, with that liberality of feeling which ignores any boundaries to the kingdom of art, the Council have decided that the *concursus* shall be open to artists of all countries.

The Society in question is far less known on the Continent of Europe than it deserves to be: and we are disposed to note a few particulars of its proceedings for the eyes of our foreign contemporaries, rather than for English readers, to whom they must be partially known. Represented by its agents in all quarters of the globe—from St. Petersburg to New Zealand, from Bermuda to Hong Kong, in Barbary and Port Natal, in St. Francisco and New Orleans—while in some years the subscriptions received have amounted to 650 guineas from the United States, 600 from Australia, 300 from the West Indies, the amount received from the whole of Continental Europe has never exceeded 200 guineas in one year.

We can only attribute this state of things to the want, out of England, of a general knowledge of the advantages which this institution offers. The subscription (one guinea sterling) is high as compared with some of the German art-unions, but the return is more than commensurate. The large reserve fund of the Society enables the Council to put into the hands of the best engravers the most important and interesting pictures in every department of art, and at this moment some of the best works of Frith, Maclise, and others are in preparation. The subscription entitles every member to an impression of one of the plates, to which is frequently added a volume of outline illustrations after the manner of Retzsch. These alone constitute a return worth double the amount of the subscription. The present year's guinea, for example, entitles each member to a very excellent engraving after Dicksee, and a volume of designs illustrating the "Idylls of the King." Besides the engravings there is the chance of a prize in the distribution, which takes place in one of the London theatres every year. The prizes consist of the right to select, by the prizeholder himself, from a public exhibition, a picture or other work of art from the value of 10*l.* to 200*l.* or more, besides statuettes and busts in bronze and in porcelain, medals in silver, choice photographs, some ceramic tazzæ (now in preparation), and other works.

The bronze statuettes are fine specimens of the art, and will bear a comparison with the best samples of Paris work. The production of statuettes in statuary porcelain has been brought to great perfection of late years in England, and the specimens of this work prepared for this society (who may be said to have initiated them), all from copyright models, and exclusively produced for the members, are carefully selected, so that not a faulty or imperfect cast is permitted to go forth. The last work in this material is especially interesting at the present moment, being a bust of the Princess of Denmark, whom the Prince of Wales is about to wed. It is reduced by Mrs. Thorneycroft, for the Art-Union, with the special permission of Her Majesty, from the original portrait bust by the same artist, being the only likeness of the Princess for which she has yet sat in England to any artist.

The medallic series is of great interest, and now comprises fourteen medals, each commemorating a painter, sculptor, or architect, and one of his most famous works.

For these purposes the Art-Union of London, now in the twenty-seventh year of its existence, has raised and distributed the sum of 289,028*l.* sterling. It has sent into distant lands, in which the fine arts were quite unknown, examples of the finest works of ancient and modern art; it has immensely contributed to the increase at home of the love and appreciation of this means of civilization and refinement; and, moreover, it has helped on the road to fame, by purchasing his early works, many an artist who is now quoted as an ornament of his time and country.

* Read at the Liverpool Architectural Society on Wednesday, the 11th instant. To be continued.

SCHOOLS OF ART.

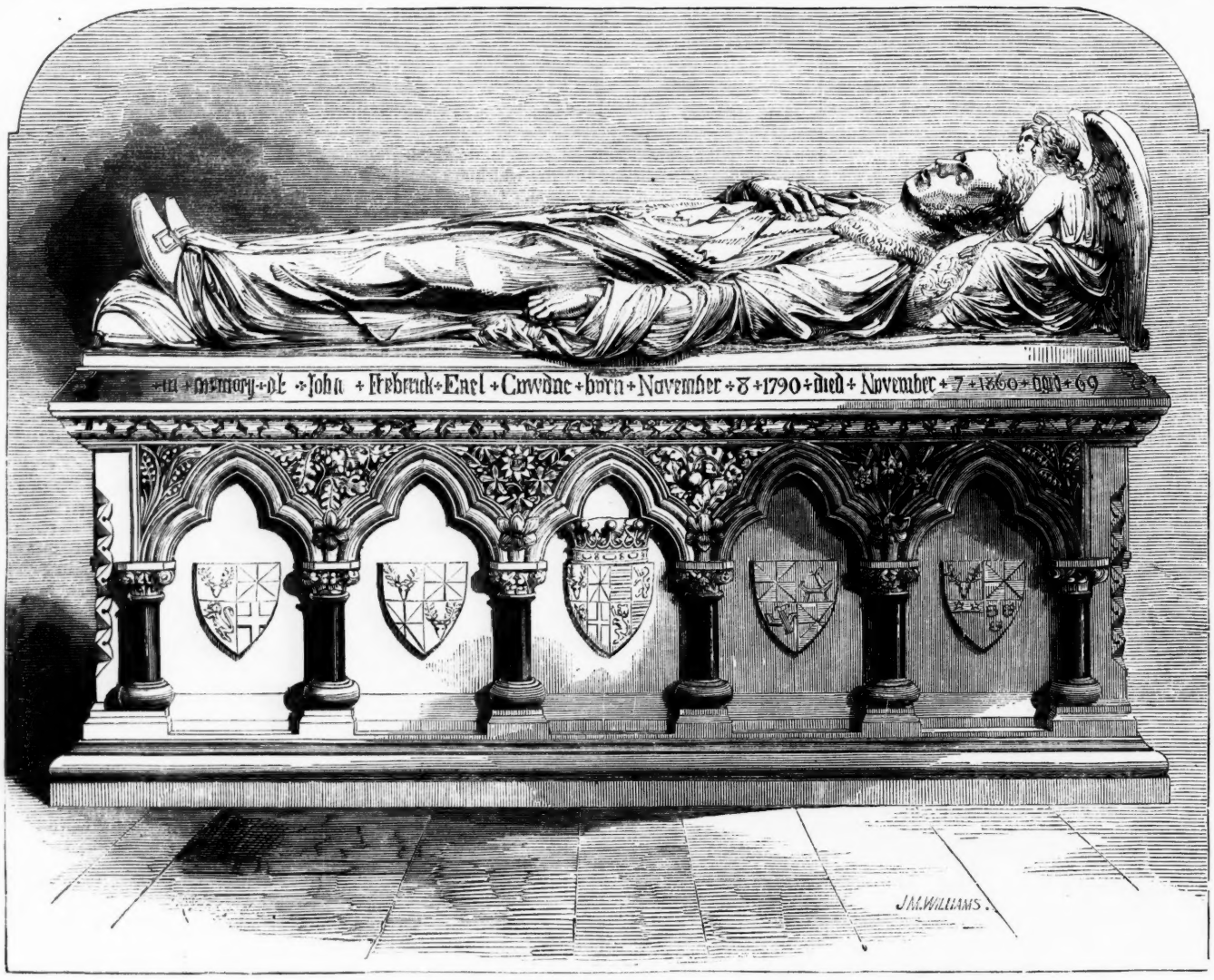
The Birkenhead School.—The prizes at this school have been distributed in the town-hall, Mr. George Harrison presiding. The attendance of ladies and gentlemen was numerous and influential. The students and their friends also mustered in great force. The chairman, in course of his address, gave the following instance of the value of this institution to the working man. I had a labouring man, he said, at the Canada works; who, after he left this school, went to America; and soon after he left Birkenhead a medal came down from Government for him. I sent the medal to the man in the United States, at the place where he had obtained employment as a labourer. On its arrival he was showing it, as naturally he would do, with pride and pleasure to his shopmates. The fact reached the ears of the manager of the works, who called him into the office, and from that day he received very lucrative employment. That was solely owing to his having obtained the medal in the Government School of Art at Birkenhead. Mr. Harrison expressed his regret that the institution was in debt to the extent of 17*l.*, which, however, he cleared off himself.

The Gloucester School.—This school, established in 1859, is at present almost self-supporting. During the past year there have been 128 students in the different classes. Of 89 students there were as follows:—Artist, 1; builders, 6; carpenters, 5; engineers and smiths, 10; railway engineer and surveyor, 1; house-painters, 2; ironmonger, 1; governesses, 2; shipwrights, 3; stonecarvers, 3; shopkeepers and assistants, 8; schoolmasters and pupil-teachers, 15; tinplate-worker, 1; pattern-maker for iron-casting, 1; photographer, 1; wood-carver, 1; plumber, 1; of unknown occupations, 27. Besides these there have been 39 female students attending day classes, and 100 children in the national schools, taught the elements of drawing and geometry. The prizes awarded by the Government inspector have amounted to thirteen medals.

The Brighton School.—The medals and prizes awarded to the students of the Brighton and Sussex School during the past year have been publicly distributed at the Pavilion, before a large and influential audience, composed for the greater part of ladies. The mayor occupied the chair, and Mr. W. Coningham, M.P., and the Rev. J. Griffith addressed the meeting. In national and other similar public schools, 691 children of the working classes had been taught by the head master during the year; and at the School of Art there had been 39 day pupils (8 gentlemen and 31 ladies) and 120 evening pupils (viz., 85 artisans and 35 schoolmasters, pupil-teachers, &c.), making a total of 159, or 850 if the national and other school children were added. The examination took place in December, and the results were that six medals were earned. Mr. Griffith stated that the school was 30*l.* in debt, and suggested a shilling subscription in aid from all present,—a proposal which was heartily responded to, many giving much more than the required shilling.

The Sheffield School.—The annual *conversazione* of this school has been held with the customary *éclat*. The rooms were filled, and various works of art were exhibited. In the course of the evening the distribution of prizes took place in the lecture-hall, the Right Hon. J. S. Wortley presiding, and the meeting was addressed by the chairman, and by Mr. Cole and Mr. Redgrave.

THE ROYAL SCOTTISH ACADEMY.—The thirty-seventh Exhibition at the Royal Scottish Academy opened on Saturday, 14th inst.



MONUMENT TO THE LATE EARL OF CAWDOR.——MR. FORSYTH, SCULPTOR.

MONUMENT TO THE LATE EARL OF CAWDOR.

THIS monument, which is erected in the family mortuary chapel in Cheriton Church, near Pembroke, is executed principally in Caen stone, the columns and capitals being marble and alabaster. It is fixed against the wall: the sculptor has, therefore, with a view to give effect to the salient points of the figure from the front, made the head rest a little on the left side, thereby giving the spectator a full view of the portrait, which, we are informed, is successful; and from the arrangement of the hands, which are both in full view, a variety of lines is induced with a repose which gives the *ensemble* a natural and pleasing effect. On the upper moulding of the tomb is an inscription on brass, relating the age of the deceased earl. There is also an inscription in the panel at the head of the tomb, containing the names of his children, by whom the monument was erected. The front panels contain shields with the arms of the different branches of the family.

His lordship was an F.R.S., a D.C.L., and lord-lieutenant of the county of Carmarthen. He built and restored many churches in Wales, nor was he unmindful of the temporal necessities of the poor.

Our readers will probably remember the model of this monument in the Mediæval Court of the late International Exhibition. The sculptor was Mr. James Forsyth, of Edward-street, Hampstead-road, London.

ARCHITECTURAL EXHIBITION.

WE would remind readers that drawings are to be sent in on the 2nd of March next. The committee have resolved to admit drawings exhibited at the International Exhibition which had not previously been exhibited elsewhere, but they appeal to architects to contribute at least one illustration of the result of their labours during the year, even if it be merely a detail of ornament or construction.

The report of the committee, just now published, shows that the Exhibition suffered last year through the International Exhibition: the balance in hand (73*l.*) was expended, and a debt of 25*l.* to the honorary secretaries incurred. It is to be hoped additional support will be given this year. The committee are making arrangements with the Society of Sculptors to exhibit in connexion with the Architectural Exhibition; and they feel that, if this can be effectually carried out, a material assistance will be rendered.

The Exhibition will be opened with a *conversazione*, on Wednesday, the 25th of March.

PHOTOGRAPHIC.

WE learn from Paris that it is becoming the *mode* there for each lady present at a ball, to leave for the hostess her *carte*, in the dress then worn; and that this is leading to improvement in the means of producing them by artificial light. The photographers, who have probably aided in bringing this about, will reap fresh harvests. Does it ever occur to members of the mighty army abroad and at home now living on photography, that they owe something to Mr. Fox Talbot?——An ex-M.P. suggests that the requirement of a license to practise as a photographer, price say five guineas, would aid the revenue, and clear some of the back streets of establishments where somewhat questionable proceedings are said to occur.——The Photographic Society having determined to award prize medals for the best contributions sent to the Photographic Exhibition, Messrs. Durham & Fenton undertook to act as judges. At the last meeting of the Society, their report was read by the secretary, when the decisions were declared to be as follows:—1, for portraits, Mr. Claudet; 2, for landscapes, Mr. Bedford; 3, for instantaneous pictures, Lieut.-col. Stuart Wortley; 4, for composition pictures, Mr. P. Robinson; 5, for copies of pictures or reproductions, Mr. Thurston Thompson; 6, for best amateur contributions, not instantaneous, Viscountess Hawarden. In our brief notice of the Society's exhibition, p. 41, we pointed out these six contributors, without one exception, as the best.——Mr. Pouncy, of Dorchester, has patented a fresh mode of taking indelible photographs, with the agency of printer's ink. The time required to produce a picture is, moreover, shortened.

BAZAAR BRIDGES.

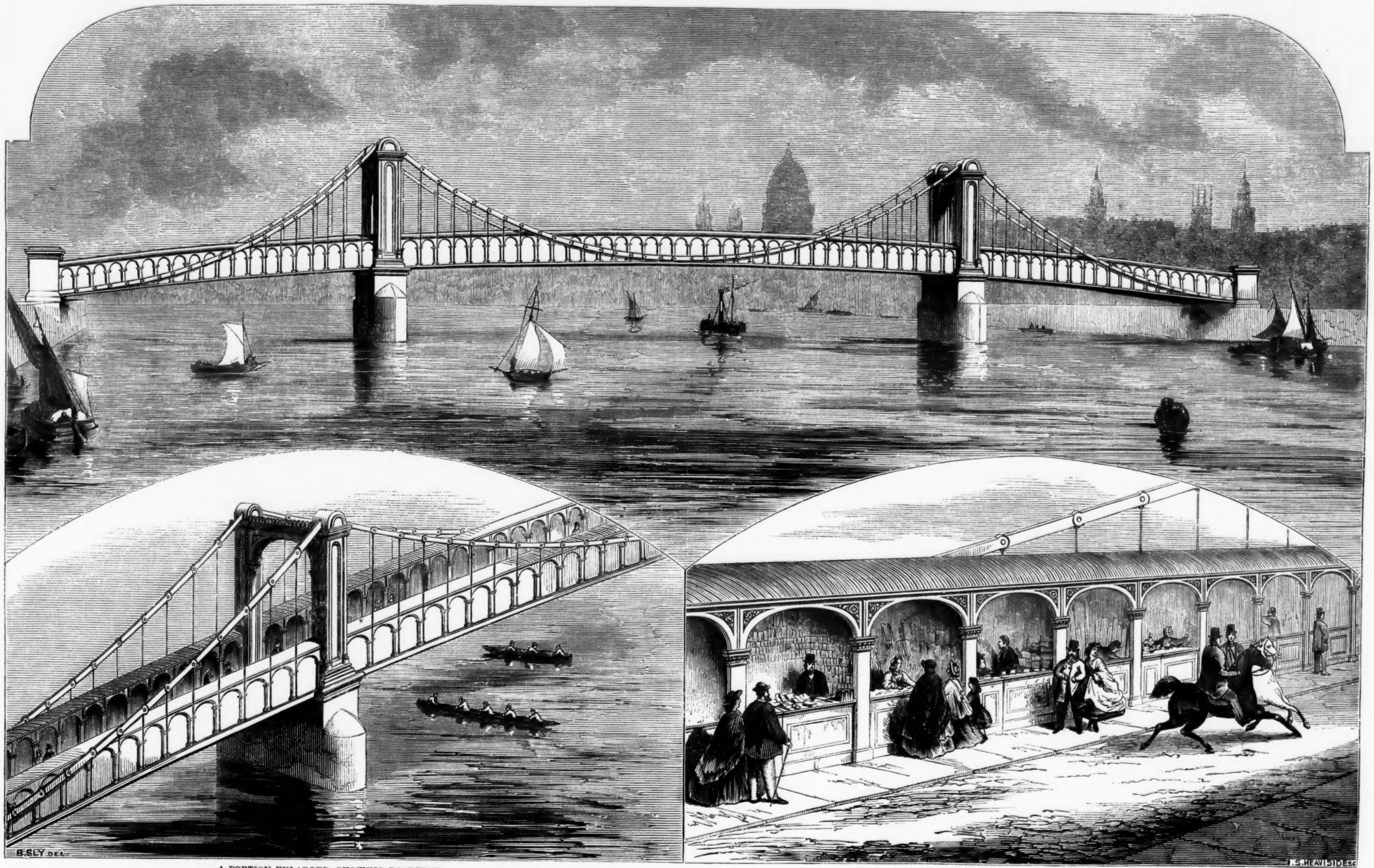
THE idea of connecting the opposite banks of the Thames in its course through the metropolis by means of Bazaar Bridges, was suggested a year ago in the newspapers by Mr. Alcock, one of the members for East Surrey. In a more recent communication, the honourable gentleman showed the feasibility of the plan, and from calculations based upon the cost of the new suspension-bridge at Lambeth, concluded that a profit of 10 or 12 per cent. might be realized on the enterprize.

It has long been felt that the existing bridge communications of London are quite insufficient for the wants of the population, and to provide additional accommodation, a company has recently been formed for the construction of a number of new bridges to connect Surrey with Middlesex. It is proposed to meet the expense of these new structures by the levying of the usual tolls,—a most objectionable method, as practically shutting what ought to be a free highway, and affecting the poorer classes in an especial manner.

Allowing Mr. Alcock, and those who think with him, to speak for themselves,—The great advantage of the plan proposed by Mr. Alcock consists in the absence of any bridge toll whatever,—the interest upon the capital expended being paid by the rents of the stalls or small shops, with which the bridge is proposed to be lined on both sides.

There can be no doubt that free bridges of this sort, in proper situations, would be extensively used, and that the thoroughfare thus created would be sufficient to induce enterprising tradesmen to lease the stalls, and thus two classes of persons would thereby be benefited,—the shareholders and the tradesmen,—not to speak of the invaluable boon which untaxed passage across the Thames would be to the public at large. The accompanying sketches are intended to illustrate the general idea only,—not to show the mode of construction.

BAZAAR BRIDGE, AS SUGGESTED BY MR. ALCOCK, M.P.—*General View.*



A PORTION ENLARGED, SHOWING ROADWAY.

VIEW OF STALLS.

FLORENCE AND PALERMO.

WHETHER, with Rogers, we protest that

> "Of all the fairest cities of the earth
> None is so fair as Florence;"

or with Mr. Hemans,* that "the justness of that poetic dictum recommends itself more the more one contemplates this attractive centre of Italian civilization, olden and modern;" assuredly Florence is a very beautiful city; although we could have little difficulty, we dare say, in exposing some particularly ugly spots and blotches on the fair face even of Florence. Its stately structures, with their marble domes and towers; its cypress groves; and its ancient sanctuaries, have all an especial interest, however, not only for the Roman Catholic, but for every true citizen of the world.

"When one looks down on Florence from the height of S. Miniato, admiring delight may be bleat with enthusiasm; for it is the very expression of a high-wrought civilization that scene of fair magnificence presents: the luxuriant Val d'Arno seems a fit framework; and the stately town, with its marble towers and domes, completes the brilliant picture as if by an artist-purpose."

The recent restoration of the ancient Basilica on this hill—so conspicuous an object from the quays along the Arno,—claims attention. A humble oratory amidst forests was the only monument originally marking the spot where Miniatus and his companions suffered martyrdom in the third century; but very soon (early in the fifth century) arose a church dignified by the title of Basilica; to which, become ruinous, succeeded, in 1013, the more splendid temple erected by Ildebrando, bishop of Florence, still standing, with essential features unchanged. This church has long ceased to be used for sacred rites, except that of interment, the commemoration of All-souls, and an occasional early Mass: its uses have now become those of a public cemetery, as is apparent from the numerous epitaphs against its walls and on its pavement.

"In no other Italian church is the celebration of All-souls so touchingly beautiful; and entering S. Miniato this morning [2nd of November, or All-souls], its aspect might strike us as too gaily decorative, too fairy-like, but for those funereal accessories suited to the day's ritual—the black-robed priests, the measured chant to organ-music, the velvet pall and catafalque, the yellow tapers in high candelabra, and purple banner hung from the gilded cross. Its whole area of pavement is flushed with flowers, in garlands, wreaths bound with black silk or crape, or bouquets in vases; and countless tapers gleam amidst these gorgeous piles of Nature's fairest treasures, their pale light aiding the mystic meaning which else might be lost in the joyous loveliness of such resplendent offerings. Here we see a cluster of branching lamps, here a circle of lofty candelabra, or files of humbler candlesticks ranged symmetrically on the tombstone, whose surface is, in some instances, one bed of piled-up flowers, evergreens, and that feathery flaxen-hued grass peculiar to the Tuscan Flora; but the whole solemnized by the cross, rising, plainly formed of unstripped boughs, from its centre. The cemetery outside is alike adorned and illumined: bright garlands hang against the time-worn marble walls; and where the chiselled epitaph is wanting, an affectionate tribute in large letters on a scroll stretched over the gravestone, supplies its place for the honour of the dead this day."

Lights in cemeteries, therefore, in honour of the dead, are by no means an extinct observance of long past time; but whether the tapers thus lighted in the cemetery of S. Miniato in the day-time are considered to "disturb the spirits of the saints," we do not know; but should rather think not; otherwise the practice would doubtless be prohibited, as it was by the Council of Eliberis, previous to the sixth century. At present, in Florence, there is clearly no prohibition:—

"The Florentines are indeed earnest, and ready for pecuniary sacrifices in regard to these observances, to a degree scarce equalled by other Italian citizens. I was told [continues Mr. Hemans] that one illumination before a monument in the crypt of S. Miniato had cost 100 francs; and the same day learnt that the good woman in whose house I lodged had spent seven scudi for the flowers and lights on the tombs of a mother and son cut off in the bloom of youth. For the whole day these decorations remain in this cemetery and temple."

The church itself is a remarkable-looking edifice.

"One is struck, at the first glance, by the aërial majesty and harmonious effect of this interior,—by the features of the early Roman basilica, preserved in their simplicity amid magnificent details that in no way interfere with the grandeur of the leading design. One singular feature is the spacious crypt, entered under arcades that bound the extremity of the nave, and made more important than the sanctuary itself, which we ascend to by a double staircase above this crypt (or confessional), the latter being thus seen into from the portals, together with the tribune and apse on the higher level. That lower church, divided into five aisles, supported by thirty-eight graceful columns, whose shafts and capitals are evidently (from their disagreement) the spoils of more ancient and classic buildings, is a work of architecture extraordinary for the eleventh century; so pleasingly blended are solemnity and grace, lightness and solidity, in its character. In the tribune above are splendid specimens of marble intarsio, on the screen and ambo, unquestionably coëval with the church's origin; but the barbaric style of the figures under the ambo-desk, a supporting eagle with a statuette below, betrays the inferiority of all save the ornamental in that period's art, these being supposed by Rumohr (*Italienische Forschungen*) an offspring of some Greek chisel in the eleventh century. In the apse is a colossal statue of severe and imposing character,—the Saviour, in gold-embroidered vestments, on a throne, holding a closed volume, and giving benediction; the countenance stern and awful, with dark hair and beard; beside Him the letters Alpha and Omega, and below, the accustomed symbols of the Evangelists; on one side, the Virgin; on the other, St. Miniatus, dressed in the regal paludamentum, and offering a crown; palms, fruit-bearing trees, the pelican and dove, and, on miniature scale, figures of monks, occupying interstices; on a frieze below an imperfect inscription, with the date 1297. But is this referring to the mosaic's origin, or to restoration?

In this noble old church we are struck by analogies with the earliest basilica-type, and also by characteristics, thus soon developing, of the style peculiarly Tuscan. Nave and aisles are divided by lofty columns of veined marble; and at the centre an arch spans the width, corresponding to the chancel-arch beyond, and resting on clustering columns of dark green marble (restored in scagliola). Above the arcades on each side rise attics, pierced by narrow round-arched windows; and this whole surface of walls is ornamented with that inlaid work in coloured marbles distinguishing Tuscan Mediæval architecture; but here only of dark green and white; the latter forming the groundwork, on which are inserted diamonds, squares, circlets, and horizontal bands. Some beautiful Corinthian capitals have evidently been fitted to shafts not belonging to them: others, with flat, heavy foliage, betray decadence in art. In front of the arcades, between the upper and lower church, stands an altar, beneath a vaulted marble canopy, beautifully wrought in coffers and *rosoni*, by Michelozzi, whom Piero de'Medici, 1448, commissioned to prepare this superb chapel for the Crucifix, once here, which bowed its head at the prayers of St. Giovanni Gualberto! Amidst the vicissitudes this church as passed through, several early paintings have been preserved, though others are faded into mere shadows on its walls. Some restoration requisite was ably achieved by Marini. It is six years since the renovation of this church commenced, and workmen are still engaged, though little remains to be done."

The new façade of S. Croce, commenced September, 1857, its first stone laid and blessed by Pius IX., promises a noble addition to the public embellishments of Florence.

"With an estimate of cost at 45,000 scudi, the energetic architect, Chev. Matas, began his task while but a few *paoli* were the instalment yet advanced towards that fund. A wealthy English resident (Mr. Sloane) contributed the greatest part of the entire amount: and in May '61 a royal decree ordered the Municipality to assign 56,138 lire. Long since was at hand the total requisite, for the rest from free-will offerings; and 80 labourers, in the year '61, pursued their work every day under the architect's continual direction. His design is founded, with modifications, on that preserved among the drawings of Cronaca, in a Tuscan Gothic accordant with this temple's character and with the finest models of sacred structure in this city; the material of native marbles, white, grey, dark green and dusky red. When uncovered to view, we may expect to admire in this work a splendid and harmonious elevation, worthy of the high traditional and patriotic honours attaching to *S. Croce*. Among rich but not over-elaborate details, sculpture has prominent place."

To this convent attach the gloomy and disgraceful remembrances of the Inquisition, whose tribunal and prisons were within its walls till the suppression in 1782.

We may take a glance at Sicily before concluding our notice of Mr. Hemans's interesting volume.

St. Rosalia is a highly-distinguished saint in Sicily; and ever since "the invention,—*i. e.*, the discovery,—of her relics" in 1624, the festival of St. Rosalia at Palermo has thrown all other festivals into shade, even in this paradise of religious highday and holiday observances. The relics were discovered on the ancient Mons Erta, which dominates the wide plain extending to the city of Palermo, and forms a striking feature in the scenery around the city. This height has long been known by the name of Monte Pellegrino: it is a constant resort of pilgrims to the Holy Shrine.

"A level path leads through the valley till, on doubling a steep headland at one extremity, we at once come in sight of the canonical buildings, sheltered by a lofty overhanging precipice, with a few cottages,—one a rustic *osteria* for refreshment,—that cluster around. An outer chapel, first entered, seems neglected and decaying; its only work of art a small statue of the saint on a porphyry column. Thence, emerging into the open air, we enter the sanctum sanctorum, or grotto-chapel above the tomb, where prevails a solemn dimness, partially illumined by silver lamps pendant before the altar, whose light gradually discloses, as the eye becomes accustomed to such gloom, the singularly blent features of art and nature in this wild sanctuary. Its vault of living rock expands into the form of a cupola adorned by fantastic pendants, like the honeycomb vault of Arabian architecture. The rudeness of the cavern-like interior brings into relief the splendours of altar and costly offerings; most interesting amidst which sacred objects, thus set in nature's framework, is the recumbent statue of the saint, by Tedeschi, displayed dimly by taper-light, through a double grating; as at the moment of death;—a death that seems rather the rapturous transit to beatitude, that 'melts in visions of eternal day,' than a painful crisis of mortality; the ecstatic and lovely countenance, as well as the graceful form, executed with consummate skill, though this work belongs to an inferior school of modern Italian art, and suffers in effect from the cumbrous magnificence of its golden robe, the offering, valued 2,000 ducats, from Charles III.; the brow crowned with roses, also golden, a profusion of jewelled rings on the fingers, a broken sceptre in one hand, whilst a little angel holds a garland of gold lilies, to place this also on the head: there is altogether an excess of pomp injurious to the artistically-beautiful and truthful in this figure."

How curiously this recumbent and entranced-like statue of "the Virgin Rosalia" of "the celestial life," in its cave, or grotto, reminds one of the ecstacies of mystic saints, in their cells and sanctums; and of the still more ancient trances of the holy hermits of Egypt in their grottoes, and of oracular sibyls in their caves, such as the one Æneas found at Cumæ's "city of the dead," where—

> "In her cave, upon a rock, by night,
> Reclined the mad prophetic Sibyl!"

About a mile beyond the gates of Palermo is a cemetery, planted with cypresses, whose dark foliage and lofty stems are visible from afar; the extensive platform they rise from being elevated above the surrounding valley, so luxuriantly beautiful, in which the Sicilian metropolis stands. Spacious buildings here adjoin an ancient church, originally attached to a Carthusian monastery, bearing traces of past magnificence, though now most forlorn, and apparently abandoned to the fate which threatens, of total decay. The church, in no way remarkable externally, presents, in the interior, an aspect of gloomy antiquity, spacious, lofty, dimly lighted, and stained by damp. To this church the Palermitan population was streaming for the vespers of Easter Monday, A.D. 1282, when the massacre commenced which has rendered "the Sicilian vespers" a phrase of horror. Charles V. mentions an eclipse of the sun on the day the foundations were laid, in the twelfth century; and here, exactly 500 years after the blood-stained vespers of Palermo, was formed the public cemetery.

The sanctuaries of Palermo acquire a new interest when viewed in connexion with recent events. Strange to say, amongst the most liberal and revolutionary of its citizens were the monks and clergy; and a singular scene presented itself at the Rosalian festival of 1860.

"On the 15th July that year, St. Rosalia's festival assembled a grouping of display yet unprecedented, and contrasts stranger than fiction ever exerted itself to imagine, within the Norman cathedral. From an early hour the national and the 'dictatorial guard' had been on duty within and around the church: presently, in all the pomp of Spanish etiquette, arrived the senators* in long black silk robes, with sleeves and collars of gold embroidered white, driven in two ponderous gilt chariots shaded by white plumes and overspread by the wings of the imperial eagle, heralds with drums and trumpets sounding in the van; but one whose appearance was greeted by the shouts of thousands louder than the burst of military music, came in a common hired coach. Entering the church, that man was received at the portal by the archbishop and canons with holy water and aspergillum, as royalty or its representative; and with this venerable retinue passed up the nave to the splendid sanctuary, a scarlet canopy supported over his head: that soldier in the red blouse sat on the viceregal throne, his broad-brimmed Calabrese hat on his knee, his black handkerchief loosely thrown round his neck, but acquitting himself with all the propriety required by his novel position during the Pontifical High Mass that followed; after which ceremony, the civil officers returned in the same state to the Royal Palace, but now escorting in one of their gilt coaches the Liberator of Sicily; and there in the post of honour, the long-robed magistrates opposite, visible to all through the glazed panels, was the place of the Hohenstaufen, Anjous, Bourbons, of the Viceroys of Spain and Naples, this day filled by Garibaldi!"

Mr. Hemans's new volume is full of curious interest: besides a mass of descriptive and historical details regarding the monuments and sanctuaries throughout Italy, there is much interesting matter in it as to Italian literature, poetry, and the drama.

* "Catholic Italy: its Institutions and Sanctuaries." Part II. By Charles Hemans. Florence: Printed by Cellini & Co. London: F. F. Molini. 1862.

* The municipality of Palermo, as also of Messina, bear this dignified title, "senate," being composed of a pretor, and six assessors of patrician rank.

SOCIETY OF ARTS MEMORIAL OF THE PRINCE CONSORT.

AT a General Meeting of the Society, on the 7th inst., Sir Thomas Phillips in the chair, the Council recommended that the memorial should consist of a bust of His Royal Highness in marble, to be placed in a suitable manner in the great room of the Society; and that a gold medal, to be called the Albert Medal, should be provided by the Society, to be awarded by the Council, not oftener than once a year, "for distinguished merit in promoting Arts, Manufactures, or Commerce."

Sir John Pakington, bart., moved the adoption of the report. He had no hesitation in saying that, in his opinion, the recommendation of the Council—that they should erect in that room a bust of His Royal Highness—was the best that could have been made.

Mr. J. H. Murchison seconded the motion for the adoption of the report; and he was glad to find that every suggestion which he made on a former

occasion had been adopted by the Council. He thought—although a bust was an appropriate method of keeping alive the memory of the Prince—yet, to perpetuate the great objects which His Royal Highness promoted when living, the founding an Albert Medal was a recommendation which was deserving of the strongest approval and support. This Society, he believed, since its foundation, had awarded no fewer than 20,000 premiums for the promotion of the arts and sciences; and if, in future, they had a medal to be denominated the Albert Medal, it would be as greatly coveted as the Copley Medal of the Royal Society.

Mr. J. Scott Russell said he would suggest the alteration of the word "bust." A bust, as generally understood, meant a rather insignificant work of art. If a little latitude were allowed, and the work of art were not called a bust, he should prefer it.

Mr. Godwin suggested the use of the words "sculptured memorial." He trusted that, whatever might be the result with regard to this question, the artistic element would not be lost sight of in the proposed Albert Medal, inasmuch as that was a branch of art in which they were at present very deficient, from the very little encouragement that was given it.

Mr. F. Lawrence thought the Council had very properly worded their report. A good bust was better than a bad statue. He hoped the decision of the meeting would be in favour of a bust, which they might all admire, as the result of competition amongst the artists of the day.

Mr. Underdown thought the recommendation of the Council should be adopted in the matter of the bust. He did not agree with the gentleman who had suggested competition for the design of the bust. He thought the system of competition in art was bad, and had this serious drawback—that the better class of artists would not compete.

Mr. W. H. Bodkin said, the wording of the report was such as to admit of any accessories to the bust which the means at command might enable them to supply, so that the report might be adopted in its present form, with the expression as it there stood, "to be placed in a suitable manner in the Great Room of this Society."

Sir John Pakington did not agree with Mr. Scott Russell in his remarks, depreciating, as he thought, unduly, busts as works of art. They must all have in their minds many instances in which marble busts were very splendid works of art; and he thought it would not be desirable that any expression of opinion should go forth from this Society to undervalue the importance of such productions. But having said this, on the other hand, he really felt very little choice in his own mind whether they placed in that room a bust or a statue of His Royal Highness. He thought the matter might be left open by the addition of the words either "sculptured memorial," or "portrait in sculpture."

After some remarks from other members,

Mr. Bodkin suggested that the resolution should be passed as it stood; and if hereafter it should be found expedient to depart from it and to extend their design, the Council could report to that effect to a future meeting.

The original motion and an additional motion as suggested were then both passed unanimously.

INSTITUTION OF CIVIL ENGINEERS.

Wood in India.—ON the 3rd instant (Mr. Hawkshaw, president, in the chair), the paper read was "On the Woods used for Sleepers on the Madras Railway," by Mr. Bryce McMaster.

The native wood sleepers having hitherto been found for the most part to fail,—on the Madras Railway between 30 and 40 per cent. requiring to be renewed annually,—the author undertook an investigation with a view of ascertaining the causes of this deterioration, and whether those causes could be overcome, so as to render available the vast resources of India. Thirteen hundred sleepers, of sixteen different woods, were submitted to careful examination and scrutiny twice at an interval of twelve months. The sleepers were variously placed, both on embankments and in cuttings: in some cases they were entirely covered with ballast to a depth of 4 inches, while in others they were as much as possible uncovered, and completely so from the rails to the ends, the ballast being only raised 2 inches in the middle of the way, and sloped off so as to carry away the water under the rails. From these observations it appeared that only five woods—Chella Woonjay, Eloopay, Kurrah Murdah, Palay, and Karavalum—were sound at the end of two years, the other eleven not lasting even that time. Also, that when the sleepers where uncovered, decay was less rapid than when they were buried in the ballast. It was noticed, that of the sleepers beginning to rot, 19 per cent. had commenced under one or both chairs. This was due to the retention of moisture under them, and might be remedied, the author believed, by tarring the seats of the chairs.

English creosoted sleepers led, say, 100 miles by rail and 50 miles by road, cost 9s. 6d. each; while good, native wood, plain sleepers delivered at the works averaged 6s. each. If establishments and apparatus for creosoting were erected in convenient positions near to each extensive jungle, it was believed sleepers of common wood might be procured for 4s. 6d. each, and be creosoted for about 1s. each.

In proof that the resources of India were likely to be equal to the demand, reference was made to the report of the Conservator of Forests for the official year 1859-60. From this it appeared that from the Salem Jungle alone—one probably of twenty in the Madras Presidency—about 246,000 sleepers, or sufficient for 133 miles of railway, had been cut during that year. Of this number about 62 per cent. could not be used plain, and were practically useless, owing to the want of artificial means for preserving those of a perishable nature. But as a supply from each jungle of 2,000 sleepers per month would provide for the construction of 500 miles of railway in that Presidency within the next five years, and for a renewal of 33 per cent. of those already laid, it might be confidently anticipated that the supply would not fail, if means were taken to make the naturally perishable sleepers last a reasonable time.

Drainage of Towns.—On the 10th, Mr. McClean, V.P., in the chair, the first paper read was a "Description of the Drainage of the Borough of Dundee," by Mr. John Fulton.

It was stated that, previous to 1851, this town was in a most defective condition in a sanitary point of view. In that year the borough was brought under the powers of "The General Police Act for Scotland;" but owing to a defect in the drainage clauses of the Act, the sewerage was not commenced until 1856. It, however, progressed steadily after that date, and was entirely completed in five years, at a cost of 52,000*l.*

In designing this drainage, one primary object kept in view was the application of the sewage to some useful purpose, although, in the mean time, it was allowed to flow directly into the River Tay. Accordingly, the whole drainage, so far as practicable, had been carried to one point—the outlet of a sewer previously constructed by the Harbour Trustees, to intercept the drainage of the town, and prevent it from entering the docks or tidal basins. The sewer had a fall of 1 in 400, was 7 feet high by 3 feet 9 inches wide, and its discharging end was 8 feet below the level of mean tide. The sewage discharged by it, in dry weather, measured 2 feet in depth, and during storms, 6 feet. The velocity, in the former case, was 65 feet per minute, and in the latter 116 feet per minute. The drainage had been carried out by a combination of brick sewers and salt-glazed fire-clay socket-pipes, of dimensions suitable for the discharge of the sewage and the flood waters combined. The whole of the brick egg-shaped sewers were provided with invert blocks of glazed fire-clay.

In the course of the paper the statement was made that no ventilation whatever had been applied to the sewers in Dundee, and none was contemplated; for although a length of thirty miles of main sewers, and nearly as many miles of branch drains, all closely trapped, had been in use for several years, not a single complaint had been made regarding foul emanations from them. The sewers were kept free of all silt, except sand, by the flow of the ordinary sewage and rain-fall, regulated by the flushing gates, so that no putrescent substances were retained in the sewers or drains, to fill them with deleterious gases, and to poison the inhabitants. It was believed it was only where sewers were badly constructed, as regarded their form and water-run, that putrid matters were retained in them to bring disgrace on the very name of drainage. It was thought that no sewer under 10 feet in height ought to have an invert of more than 9 inches radius, and that a radius of 6 inches was quite large enough for the invert of any ordinary sewer. When the sewage was confined to such a small compass as this, its scouring power was very great; and if care were taken to have the invert blocks laid to a straight line, there would be but little silting, even with a slight fall.

In conclusion, it was stated, as the result of the drainage of the town, so far as could at present be ascertained, that as compared with former years, a decided decrease had taken place in the rate of mortality.

The second paper read was a "Description of the Sewerage and Drainage Works at Newport, Monmouthshire," by Mr. Alfred Williams.

It appeared that, prior to the construction of the works which formed the subject of this communication, several miles of sewers and drains had been built at different times, but mostly in an imperfect manner, and without regard to any general system.

The plan comprised about seven miles of new brick sewers, varying in height from 14 inches to 4 feet 6 inches, all above 14 inches being egg-shaped and narrow at the invert; with outlet works; also of a sufficient number of entrances with ventilating shafts, and of street gullies. The contract for the works was let to Mr. J. Phillips, and their cost had amounted to 11,862*l.*

The author did not consider it advisable to use stoneware pipes as main sewers, having regard to the circumstances of the town, the existing works, the relative cost of brickwork and pipes, the quantity of *débris* washed from the roads into the sewers, the difficulty of preventing improper interference after construction, &c. Under the Newport contract, the cost of radiating brick sewers 14 inches diameter and 4½ inches thick, at a depth of 10 feet, with a junction-pipe for every house, was 7s. 7d. per lineal yard. This was about the same as a pipe 12 inches diameter, well laid, with junctions. Sewers 2 feet 6 inches by 1 foot 10 inches, of brickwork 4½ inches thick, similarly constructed, and large enough for a man to pass through, cost 11s. per lineal yard. The author generally recommended brick sewers not less than 2½ feet high for all important lines, excepting where the fall was very great; and he confined the use of pipes to house-drainage, for which they were admirably adapted, to short branch sewers on steep inclinations, and to conduits for fresh water.

The rate of mortality in Newport in 1850, previous to the adoption of the Public Health Act, was 30 3 per thousand, whilst for the two years ending Michaelmas, 1861, it was rather less than 20 per thousand, or below the average of England and Wales. This very large decrease was no doubt due, under Providence, to efficient drainage and water-supply, to the prevention of overcrowding, and to other sanitary measures.

BRISTOL SOCIETY OF ARCHITECTS.

ON the 12th instant, this society held its first ordinary meeting for 1863; Mr. Gabriel in the chair.

The hon. secretary, Mr. E. W. Godwin, explained the adjournment of the last two ordinary meetings. He said the papers promised by the president and Mr. Clark were, of course, not to be expected in the midst of their domestic afflictions; and the long-promised paper on fenestration, by Mr. Lysaght, was again put off by the author only a day or two ago. Under these circumstances he felt himself again bound to come forward with a paper rather than that the ordinary meeting should fail for want of a subject for discussion. He then read a memoir of the destroyed monasteries of Bristol, with some reflections on the present state of art. In the course of the discussion at the conclusion of the paper,

Mr. J. B. Atkinson called in question the assumed connexion of Gothic and Classic, and held that the monstrous births of new styles in the present day was one of the results of false eclecticism.

PROVINCIAL NEWS.

Leiston (*Suffolk*).—The Works Hall, at Leiston, which has just been erected, in the Italian style, at the expense of Mr. Richard Garrett, has been opened. The new hall, which measures 74 feet by 34 feet, will be used for different gatherings, and specially for the drill of the 9th Suffolk Rifle Corps, under the command of Capt. R. Garrett, jun. Two smaller rooms above have been devoted by the proprietor respectively to the Mechanics' Institute and to a committee-room, besides providing for the comfort of the workmen who live at a distance, giving them all the appliances of a home for their meals.

Leicester.—A warehouse is about to be erected for Mr. C. Noon, on a plot of ground adjoining the Temperance Hall, in this town. Mr. Millican is the architect. Mr. Firn's tender has been accepted for the work appertaining to the bricklayer, &c.; and Mr. Clifton's for the carpentering. Mr. Firn's estimate is 3,079*l.*, and Mr. Clifton's 2,378*l.*

making a total of 5,457*l.* The lowest of the whole tenders is that of Mr. Osborne, which is 5,464*l.* The following are the tenders:—Whole tenders: Slap (London), 7,171*l.*; Dennett (Nottingham), 5,999*l.*; Wykes, 5,989*l.*; Bland, 5,900*l.*; Neale, 5,900*l.*; Porter, 5,660*l.*; Osborne, 5,464*l.* Tender No. 1, bricklayers, &c.: Slap, 3,924*l.*; Wykes, 3,232*l.*; Firn, 3,079*l.* Tender No. 2, carpentering, &c.: Slap, 3,247*l.*; Dennett, 2,912*l.*; Wykes, 2,757*l.*; Jarrom, 2,430*l.*; Clifton, 2,378*l.*

Aldershott. — The foundation-stone of the Aldershott Mission Hall, or Soldier's Home, was to be laid by the Right Hon. the Earl of Shaftesbury, on the 11th inst. The institution is intended to supply the means of quiet recreation and instruction to the troops, in addition to providing amusing reading, and facility for chess, draughts, and similar games. Refreshments, of a harmless character, will be sold at the Home at a moderate rate; and the whole undertaking, which has been originated by a philanthropic lady, is intended to counteract the demoralizing tendency of some of the places of public entertainment in the vicinity of the camp to which the troops resort in their leisure hours.

Rodbourne Cheney (*near Swindon*).—We are asked to state that Mr. Mantell, of Swindon, was the architect of the new vicarage-house here, and not Messrs. Money & Sons, as might be inferred from a recent incidental notice of it while describing the school-house recently opened at Rodbourne.

Wolverhampton.—The Agricultural Hall, which is being erected by a company, is nearly completed, and occupies a prominent position on Snow-hill. It is intended by its projectors for use as a corn exchange, and for the display of agricultural implements. The building covers a space of 1,200 square yards. The large room is 160 feet long and 60 feet in width. It is lighted from the roof by means of three rows of colourless rough plate-glass, manufactured for the purpose by Messrs. Chance; the object in selecting this description of glass being to secure a uniform light throughout the building. The roof, which has been made intentionally low, is supported on eleven principals, with circular laminated ribs, having a radius of nearly 30 feet. The distance from the floor to the eaves of the roof is 20 feet, and to the apex 40 feet. At either end of the room are three windows for increasing the light afforded by the roof. One portion of this room is intended for the farmers and dealers, and the other for the exhibition of implements. Adjoining the large hall is an apartment, 40 feet long by 26 feet wide, designed for use as a settling-room; and there is also a sack or store room. The yard contains closets and other conveniences for persons attending the hall. The chief entrance to the building fronts to Snowhill, the façade being of Italian design, carried out in Bath stone. There is a spacious entrance-hall, and on each side of the door are convenient offices. It is proposed that at a future time the portico shall be surmounted by a clock-turret. For the present, however, it will be terminated with a recessed arch, containing an agricultural emblem, indicating the purpose of the building. The other entrance to the hall faces the Cleveland-road, and will be used for the admission of implements. The floor of the interior of the hall is boarded, and flues are laid underneath for warming the room with hot water. The building will be lighted with gas, the large room by means of twelve star lights of thirty jets each, suspended from the roof. The outlay incurred in the erection will be about 2,000*l.* The design was furnished by Mr. J. R. Veall, of this town, architect; and Mr. G. Heveningham is the contractor for the execution of the works.

CHURCH-BUILDING NEWS.

Littlehampton, (Sussex).—Galleries have been erected in the Congregational Chapel of this place, from the designs of Mr. J. G. Stapelton, jun., architect. Light iron columns, with floriated T shaped caps, support the trusses. The purlins between are trussed. The fronts are light iron, supplied by Messrs. Walter, Macfarlane, & Co., of Edinburgh, the design of which was exhibited by them at the International Exhibition. The whole of the works have been executed for 236*l.*, by Mr. Snewin of the same place, and by the addition 200 sittings have been obtained.

Worthing (*Sussex*).—Mr. Blaker, of this town, having sent in the lowest contract for building the Roman Catholic Chapel about to be erected here, his tender has been accepted. It is said to be somewhere about 1,250*l.* The edifice is to be constructed of Bath and Pulborough stone, and flint, and will be designed in such a manner as to permit of the easy addition, at a subsequent date, of chancel and transepts. The structure will occupy an area of about 70 feet by 24 feet.

Clifton (*Beds*).—The works undertaken for the enlargement and restoration of the church here are fast drawing to a close. They have been carried out from designs by Mr. Edward Haycock, architect, of Shrewsbury. The carving has been performed by Mr. Sansom.

Bacton.—The roof of the nave of Bacton church was recently found to be in a dilapidated and dangerous state. It has now been repaired and straightened; many new timbers, bosses, and carved spandrils have been added; and iron bolts and straps now hold it altogether. The wall plates have been renewed, and harmony has been made with the old red brick and flint arches of the clerestory windows by the use of an ornamental red brick cornice beneath the eaves. The roof has been covered with new green slates. By the use of a scaffolding, contrived by Mr. Elliston, of Ballingdon, builder, the whole of this restoration has been effected without depriving the parishioners of the use of the church. The eastern bay of the nave had distinct remains of ancient colour in patterns upon the timbers. These have been renewed in the old colours, by Mr. Osborne, of Bacton, at the expense of the rector, and under the direction of the architect. This painting was formerly harmonized by stained glass in the clerestory and other windows, which have now only white glass in them. It has been remarked by several persons that the whole roof should be painted; but the rector and churchwardens dissent from this view. It is intended to re-pew and otherwise restore the church.

Hereford.—We understand that the restorations and repairs of this cathedral will soon be completed, and that it is intended to celebrate the event on the 25th of June. The organ is to be removed, and a large sum of money laid out on it.

Wharram-le-Street.—The parish church of this village has been repaired and re-opened. The work of restoration has been done at the expense of Lord Middleton. Stall seats have been substituted in lieu of the old ones, and additional accommodation has consequently been provided; the church now being capable of seating one hundred and twenty persons; being an increase of fifty. The flooring is tiled, and the edifice is heated with Mr. Wood's hot-air apparatus, the cost of which was 20*l.* The roof is covered with Staffordshire tiles. The architects were Messrs. J. & W. Atkinson, of York; the contractors, Messrs. Wood & Gibson, of Malton. Mr. Smiddy, of Malton, undertook the plumbing and glazing, Mr. T. Reed the iron work, and Mr. Severs the painting.

Lullington.—The sequestered parish church of Lullington, near Frome, after having undergone complete restoration and some extensions, has been re-opened. The work of restoration has been carried out by Mr. Jones, of Bradford-on-Avon. The west end has been lengthened, and the old decayed pews have given place to open benches. The architect was Mr. T. H. Wyatt, of Wilton, the Salisbury diocesan architect; and the entire expense has been defrayed by Mr. William Duckworth, of Orchard Leigh, the patron of the living. The organ is by Messrs. Hill & Son, of London.

STAINED GLASS.

St. Anne's, Soho. — The large stained-glass window by Messrs. Hughes & Ward, which formed part of the International Exhibition, has just been set up in St. Anne's Church, Soho.

Little Rissington Church (*Gloucestershire*).—A painted glass window of three triplet lights has been recently placed in the chancel of Little Rissington Church, in memory of the late Rev. R. Wilbraham Ford, his wife, and youngest daughter, by the sons and daughters of the late rector. They represent seven events of the life and passion of our Lord,—"Our Lord bearing the Cross," "His Baptism," "The Last Supper," "The Crucifixion" and "Ascension of our Lord," "Christ appearing to St. Mary Magdalene," and "Christ at the Well of Samaria," upon a mosaic ground. This memorial is the work of Messrs. Lavers & Barraud, of London.

Newark Church (*Notts*).—Upwards of 798*l.* have been obtained towards a memorial window in the Newark parish church.

Sowerby Church (*Yorkshire*).—A window of stained glass has just been inserted in the north transept of this church. The window has been erected by Mrs. Flavell, of Keswick, in memory of deceased members of her family. The window represents the baptism of Christ, and the symbols of the four Evangelists.

Horsley Church.—A window of stained glass has been placed in the east end of the old church: the gift of Mr. J. Davenport, in memory of his grandfather, the Rev. Samuel Davenport. The window was executed by Messrs. Clayton & Bell, of London. In it our Lord's crucifixion is illustrated, in three compartments. The first gives his coming and finding his disciples asleep; the second, his crucifixion; the third, Mary Magdalene weeping at the sepulchre.

Manchester Assize Courts.—At the Manchester Assize Courts, now being erected, the windows having a northern aspect are being filled with stained glass. That in the drawing-room of four lights, furnished by Messrs. Heaton, Butler, & Bayne, of London, is heraldic in design, the heraldry representing the arms of the United Kingdom, with shields enclosed in coloured wreaths. The stained-glass window in the breakfast-room is supplied by Messrs. Edmundson & Son. It is of five lights. The centre represents a full figure of Justice, and the other four lights have each two medallions, containing busts of four lord chancellors; viz., Lords Wykeham, Moore, Bacon, and Somers: and of four judges; viz., Gascoigne, Coke, Hale, and Mansfield. On bands running diagonally are mottoes, illustrative of the power and the justice of the law. Five quatrefoils in the upper part of the windows are filled with the arms of the Duke of Lancaster and those of Earls Ducie and Derby, as representing the territorial interests of the hundred: the other two give the arms of the boroughs of Manchester and Salford, each surmounted by a civic crown. Three windows in the dining-room are being filled with stained glass by Messrs. Lavers & Barraud. They consist chiefly of conventionally-treated foliage, into which are introduced the emblematic flora of the United Kingdom.

St. Mary's, Oldham.—A stained-glass window has been erected in St. Mary's Church, Oldham, to the memory of the late Mrs. Blackburne. The subject is the "Parable of the Talents." Messrs. Heaton, Butler, & Bayne, of London, were the artists.

St. Anne's Church, Dublin.—A handsome memorial window has been erected in this church by the subscription of the friends and admirers of the late eminent physician, Dr. William Cusack, at the north side of the apse. Over the arch of the window is the inscription, "I am the Resurrection and the Life," and the designs are intended to illustrate this text. In the upper tracery is the Resurrection of our Lord himself—the figure clothed in white, and bearing in his hand the banner of victory over sin and death. Beneath are the two angels in white guarding the sepulchre, and in front the two soldiers, "the keepers, who for fear of Him did shake, and became as dead men." The lower part of the window represents, in four panels, first, "The Raising of Jairus's Daughter;" second, "The Raising of the Son of the Widow of Nain;" third, "The Raising of Lazarus;" fourth, "The Raising of Dorcas by St. Peter." Under the window runs a brass plate, bearing the simple, unostentatious description:—"In memory of James William Cusack, M.D., born May 26, 1778, died September 25, 1861." In the body of the church, on the south side, there has been also set up a similar window, in memory of the late Mr. Charles Smyth, of St. Stephen's-green. To him and to his wife, the filial piety of their sons has erected this memorial. The window illustrates the legend which is inscribed on it—"And now abide faith, hope, and charity; but the greatest of these is charity. The artists are Messrs. O'Connor, of London. In the east wall Messrs. O'Connor have also just put up an elaborate mural brass tablet, which is erected to the memory of the late Mr. Charles Ferdinand Smyth, by his widow. The same artists are engaged upon another memorial window, to the late Chief Justice Doherty, for St. Anne's Church also.

Church in St. John's, Newfoundland.—Two windows have been designed and executed by Mr. Evans, of Shrewsbury, for a church in St. John's, Newfoundland, under the incumbency of the Rev. John Pearson. Each window contains a figure, the proportions of which are the size of life: the one being a representation of the Virgin Mary, and the other of the Apostle Peter.

GROSVENOR HOTEL COMPANY.—At the half-yearly meeting of the proprietors held last Saturday, after putting by 812*l.* towards a sinking fund to meet depreciation and renewals of furniture, and 704*l.* as a reserve, a dividend at the rate of 10 per cent. per annum was declared.

ACCIDENTS.

Fall of Brickwork in Malvern Tunnel.—A portion of the roof of the Malvern tunnel of the Worcester and Hereford railway has given way. The tunnel is a long one, covering a single line of rails, and runs through the Malvern range of hills at a point near to the Wyche; and although it is newly-built, yet for months past workmen have been engaged in repairing it, and rendering it more secure. It is bricked, and a portion, though a small one, of the roof has just fallen in, followed by a quantity of earth. A large fall of brickwork occurred some short time ago. The tunnel, says the *Birmingham Journal*, is again reported as being perfectly safe—*i. e.* until such-like slips shall again occur.

Fall of a Lime-kiln.— An inquest has been held before the coroner for Birmingham, on the body of a labourer, who resided at Halesowen. Deceased was engaged loading a cart with lime from the kiln, upon Halesowen Wharf, when the wall on the north side fell in upon him. A verdict of "Accidental death" was returned. The cause of the falling of the kiln is supposed to have been recent rain weakening its foundation.

Dunoon Church nearly destroyed by Lightning. The west coast of Scotland has been visited by a frightful storm of lightning, rain, and wind. At Dunoon, down the Clyde, the parish church was struck by the lightning, which threw down one of the turrets of the steeple. One huge square stone fell through the roof and the gallery of the schoolhouse, and was buried in the floor almost out of sight. Most of the windows of the church were driven out, and the gas-pipes wrenched, the window-sills split and broken, some of the large stones at the bottom of the walls driven in out of their places, starting and tearing off the skirting, and the copings of the pews were displaced. Several tombstones in the churchyard were broken by the falling stones, and an old monument from Iona was destroyed. It was feared at the moment by some of the residents of the locality that "the end of the world had come."

Gable blown down at St. Andrew's.—Part of a gable of a house, now in course of erection in Queen-street, St. Andrew's, by Mr. M'Intosh, builder, was blown down by the wind. The gable had just been finished, and the workmen had, it seems, apprehended the probability of some such accident, as they had it propped up with large planks of wood, &c.

THE STAGE.

Royal English Opera, Covent Garden.—In the necessarily brief accounts of new operatic and dramatic works to which we confine ourselves, when we point out the weak parts of a production the character of the notice becomes more depreciatory than would be the case if greater length allowed other portions to be dwelt on. If, for example, we were to say why we thought Mr. Bridgeman had not made the most of the groundwork for the "Armourer of Nantes," *Marie Tudor*, that amongst the characters there was not more than one for whom the audience could possibly entertain any regard, that the management had not avoided anachronism in the scenery, and so on, we should overbalance the expression of our opinion that the opera contains some of the best dramatic music that Mr. Balfe has ever written, and, as a whole, affords a very charming evening's amusement. This we wish to avoid. Miss Anna Hiles is altogether unequal to the part of *Anne Duchess of Brittany* (who takes the place of Queen Mary in the original); but with that exception, the rest of the opera is admirably performed, Mr. W. Harrison, Mr. Santley, Mr. Weiss, Mr. Corrie, Mr. Aynsley Cook, and Miss Louisa Pyne supporting the principal parts. In the first act we should especially point to Miss Pyne's cavatina, "Oh, would that my heart;" the duet, "Were all the earth's vast treasure;" Mr. Santley's barcarole; and the duet between that gentleman and Mr. Harrison at the end of the act: in the second, to the duet "Vast as the ocean," and the ballad "There's one who reared me, loved me:" and in the third act to the ballad, "Oh, love, thou'rt like a reed bent low." To justify what we said as to the scenery it will be sufficient to note that while the time of the action is 1498, the scene for the second act is a hundred years more modern. The last scene, a Norman vaulted chamber, with a balcony beyond, and looking out upon the courtyard of the castle, is very effective and well painted. The opera is sure of a run, and deserves it.

The Princess's Theatre.—Spain is the country in which Mr. Filmore has laid the scene of his *very* "Romantic Drama," "The Winning Suit," wherein kings and princesses trot about the country in a remarkably free and easy manner, but, nevertheless, disport themselves very much to the amusement of the audience. Mr. Vezin, Mr. H. Marston, Mr. Belmore (one of the best low comedians on the stage), Miss Murray, Mrs. Marston, and Miss Amy Sedgwick support it. There is some very good writing in the piece—better than has been heard for some time. Mr. F. Lloyd has painted a capital scene for the third act, the Village of St. Lucia, including the porch of a Norman church (too English), and a distant view of the country. A ruin of a Moorish building introduced at the side of the river, in which it is reflected, has an excellent effect.

THE BUILDING MATERIAL IMPROVEMENT COMPANY.

UNDER this title a Company has been formed, according to the terms of the prospectus, to secure to the building public inventions of practical utility and economy, and to provide the capital necessary for the purchase and development of such only as are proved to be valuable; and they propose to commence operations by the manufacture, on an extensive scale, of a substitute for lath and plaster for covering walls, ceilings, and partitions, called Dixon's "Patent Dry Laminæ," already used in many works for nearly two years. The board of direction consists of four architects and one engineer.

Several advantages are claimed for the material with which they are now concerning themselves, and some of these are obvious. It is light and strong, and may be done with a saving of time and money, they say, as compared with the ordinary method of plastering. Whether or not the setting coat used to finish it would always prevent the joints from making themselves obvious we do not know. As to the constitution of the direction we doubt if it be wise for architects to become commercially interested in the sale of building materials. Indeed, if we are not mistaken, it is incompatible with the rules of the Institute. Apart from this, however, the object of the Company seems a good one, and may be carried out with advantage to the community.

CAST-IRON COLUMNS.

YOUR correspondent, who inquires for a formula for hollow cast-iron columns, will find it given in Mr. Hodgkinson's work on cast-iron, published in 1846, from which all subsequent writers on the subject have quoted. His formula is (p. 334):—

$$\text{Strength in tons} = 44{\cdot}3 \times \frac{D^{3{\cdot}6} - d^{3{\cdot}6}}{l^{1{\cdot}7}} \quad \text{where } D$$

and d are the external and internal diameter in inches, and l is the length of the column in feet. In order to aid in the calculation of this formula tables are there given of values of $d^{3{\cdot}6}$ up to 12 inches diameter, and of $l^{1{\cdot}7}$ up to 24 feet length; but the formula is intended to apply to columns of higher dimensions; and in every particular case that may occur it is only necessary to perform a simple logarithmic calculation.

Your correspondent will find the above formula given at p. 674 of the *Builder*, vol. xix.; and also more fully explained at p. 532 of the *Builder*, vol. xi. If he is unable to apply the formula himself to the column whose strength he wants to know, I shall be happy to do so for him if he will state the external and internal diameter, and the length of his column.

E. WYNDHAM TARN, M.A.

THE ARCHITECTURAL ASSOCIATION AND THE VOLUNTARY EXAMINATIONS OF THE INSTITUTE.

SIR,—As one of the successful candidates in the class of "proficiency," in the late Voluntary Architectural Examination of the Institute, and a member of the class of Design at the Architectural Association, I must say that there appear to me no sufficient grounds for the statements made by your correspondent "T. R. S.;" viz.,—that the studies of the class of Design, and the proceedings at the ordinary meetings, have had their due result in helping to fit its members to take a position alike honourable to themselves and to the body to which they belong.

Now, sir, my reasons for differing from your correspondent are as follows; viz.:—On referring to the prospectus issued by the Institute, it will be found that a candidate must obtain half the number of marks allotted to the division, "Materials and Construction," subjects to which the class of Design is almost a stranger. The class may, and, doubtless, does, help its members in the art of design; but is not this a thing which may be as easily attained at home, it being merely a matter of practice?

And, furthermore, I would ask "T. R. S." whether he thinks such lectures as are usually delivered at the ordinary meetings are likely to afford much instruction to the student in such subjects as Physics and Professional Practice?

I think the time taken up by some of the lectures would be far better employed in attending to those subjects which may prove *truly beneficial* to intending competitors for next year's honours.

There is, I understand, a sub-committee appointed to investigate the working of the Association; and I think that most of the members will agree with me that this is at the present moment a very proper subject to take into consideration.

H. M.

*** This note represents the opinions expressed in three other communications on the subject addressed to the *Builder*.

"LONDON ARCHITECTURAL SOCIETY."

I HAVE the volume alluded to before me, which belonged to my late father. It is entitled, "Essays of the London Architectural Society. With four plates. Published by order. London: sold by J. Taylor, at the Architectural Library, No. 59, High Holborn. 1808." 8vo. It commences with a preface of six pages; then follow the "Rules of the Society, instituted 1806;" then a list of members, which is as follows:—

"Mr. Aikin, Bartlet-buildings, Holborn.
Mr. Ashpitel, Throgmorton-street.
Mr. S. Beazley, Duke-street, Westminster.
Mr. Billing, Reading, Berkshire.
Mr. Birkhead, Robert-street, Adelphi.
Mr. Bubb, Francis-street, Tottenham-court-road.
Mr. Busby, Queen Ann-street West, secretary.
Mr. Cood, Strand.
Mr. J. Elmes, College-hill, vice-president.
Mr. H. Elmes, College-hill.
Mr. Lowry, Titchfield-street.
Mr. Peacock, Finsbury-square.
Mr. Perry, Lombard-street.
Mr. Savage, Throgmorton-street, vice-president.
Mr. Schroder, College-hill, treasurer.
Mr. C. Smith, Upper Titchfield-street.
Mr. G. Smith, Doctors' Commons.
Mr. J. Taylor, High Holborn.
Mr. Wallen, Wellclose-square.
Mr. J. Woods, jun., George-yard, Lombard-street, president."

Then follow the four essays already named by you, occupying 139 pages. The work is complete, as it finishes with the "Finis" usually affixed to books at that period, but there is no treatise on Grecian Doric, alluded to by your correspondent.*

It would be a great gratification to myself, and I am sure to the profession at large, if the traditions of the society could be collected. My father, who was a pupil of Alexander's, and at that time in partnership with Mr. Savage (Ashpitel & Savage, Throgmorton-street), took a great interest in it; but, beyond some general anecdotes of individual members, the only tradition I remember to have heard was this:—It was the palmy days of pure Classic architecture; and some of the members tried also to revive the Classic drama. My father and Savage painted the scenes; but the success of the experiment in other respects was not great, as is often the case with amateurs. Can any of your readers furnish us with further information? I am sure it would be cordially received.

ARTHUR ASHPITEL.

ROT IN ROOF OF LOWER TOOTING CHURCH.

HAVING recently had occasion to supervise some alterations for ventilation in the roof of Tooting Church, I was led to examine the state of the timbers generally, from unmistakeable vermicular signs; and my survey discovered to me a very extensive and complete decay of some of the principal timbers. I applied my cane to some of the ceiling joists, and part crumbled away, leaving the intermediate space of the plastering of the ceiling to be supported only by the lathing. One of the queen-posts is completely eaten up at the foot, the stirrup-iron alone supporting it in its place on the beam.

* This was published separately, as stated by Mr. Woods.—ED.

Now, I beg to ask, what is to be done, short of cutting out the decayed timbers and cauterizing the remainder? or how is the plague to be stayed? Some active remedies should be immediately applied, or the next thing we shall hear of will be a coroner's inquest on some victim.

There are thousands of hungry worms at work, and they bore holes about the size of a tobacco-pipe, and convert the timber into a mere spongy state: a saturation of corrosive sublimate might to some extent affect them, but I fear it would not reach the interior of the timbers where they are at work.

And now—what is the cause of this premature decay? I simply answer, want of ventilation has been the principal one, and probably the only one, as the roof timbers appear to be Memel, and of excellent quality. It is a queen-post roof, and it is framed in the best possible manner, and of full scantlings; but so rapid is the progress of this disease, that to a certainty it will spread to every stick of timber in the church, in a very short time, and the roof must fall in.

An examination into the facts shows that the whole bulk of the roof has been hermetically sealed for years: no perforations whatever existed in the ceiling, and the slating was carefully pointed.

The church had been heated by a hot water apparatus, which, about two years ago, was removed, and a more effectual hot water apparatus was adopted. Considerable oppression or drowsiness was felt by the congregation, and it was found that ventilation was necessary, and holes were made in the ceiling, but that turned out to be of little effect: the outer covering of the roofs then had to be pierced; or, in other words, dormers or louvred openings had to be placed in the slating from within, in order to allow of the escape of the vitiated atmosphere, thus giving some little ventilation and admitting of an exit for the poisonous gases given off by large congregations.

I may remark that the Small Pox Hospital was attacked by dry rot within a few years after its erection, and the diseased parts had to be cut out, by means of which a successful cure was performed.

A. J. HISCOCKS,
District Surveyor of Wandsworth and Tooting.

"PLYMOUTH COMPETITION."

SIR,—I am obliged by your insertion of my letter to the managers of this competition, and shall be glad if you will insert the reply, which I regret absence from home prevented my sending in time for your last week's impression. Fortunately, however, it is not too late for all respectable architects to take the advice so politely tendered by the reverend writer.

J. P. PRITCHETT, Hon. Sec. of the Alliance.

Plymouth, 6th February, 1863.

SIR,—The letter of the 31st ult., addressed by you as "The Hon. Sec. of the Architectural Alliance, which includes associations in every part of the United Kingdom," to John Hill, esq., recommending, for sundry reasons, the issuing of "fresh copies of instructions, with the objectionable points erased," has been placed in my hands, and I am instructed to say, that while the committee appreciate your advice, they nevertheless presume to think that, in *this particular case*, the obvious course for any gentleman to take who may be dissatisfied with their instructions is,—not to compete.—I have the honour, &c.,

J. LOUTIT.

J. P. Pritchett, esq.

RIGHT BY POSSESSION.

Hudson v. *Foster*.—This was a case, tried in the Court of Queen's Bench, Guildhall, before the Lord Chief Justice Cockburn, which is worth a brief report as a warning to owners of property not, by neglect or laches, to lose or waive their rights. In 1812 certain land on each side of the Bedford-road, Clapham, was conveyed to the plaintiff and four other persons, as tenants in common; and the action was one of ejectment, to recover a part of one of those portions so conveyed. So far as the deeds were concerned, the title of the plaintiff seemed clear; but for more than twenty years previous to the action the defendant, who was the owner of the land lying behind the piece of land in question, had used it as his own; and now he claimed to have acquired a title under the Statute of Limitations. The action was begun in July, 1861.

Mr. Serjeant Hayes and Mr. Quain were for the plaintiff: Mr. Chambers, Q.C., and Mr. Raymond were for the defendant.

The Lord Chief Justice told the jury that the sole question was whether the defendant had for twenty years had exclusive possession.

The jury found for the defendant.

CAUTION TO BUILDERS INFRINGING THE RULES OF THE METROPOLITAN BUILDING ACT.

RECENTLY several persons were summoned by Mr. Parsons, the district surveyor of the southern division of Lambeth, before Mr. Norton, at the Lambeth police-court, for erecting buildings with bad and insufficient materials.

The first case gone into was that of G. Adamson. The district surveyor said that he would remind his worship that he some months since summoned a man named Parker for using mud in lieu of mortar, and the result was that Parker was fined 19*l.*; and subsequently, upon the officers stating that they had served a distress warrant, and that there were no goods upon which to distrain, he (Mr. Norton) sentenced the man to a month's imprisonment with hard labour. Upon that occasion a person named Green came forward and said that he was the ground landlord, and that Parker had transferred the houses to him: he pledged himself to amend the work, and that there should be no further trouble on his property. Subsequently Parker had come to the court to plead for mercy; and Mr. Perry, the chief clerk, had asked him (Mr. Parsons) if he wished to enforce the sentence. He had replied that his object was to cause the rules of the Act to be complied with; and that if Parker kept out of his district he should ask no questions, but that if he found him at work again he would most certainly have him arrested. He supposed that this leniency had been taken as an indication of want of power; for since that he had had much trouble with the buildings on Green's plot. Green had put forward men to give him (the district surveyor) notice, ostensiby as builder; but they were never to be seen; and Green was really the builder. He (the district surveyor) had proved one case against Green, for which Mr. Norton had inflicted a fine of 5*l.* as penalty for not giving notice.

Adamson had given notice for twelve houses opposite Parker's, eight of which had been built with the upper part of the external walls above the ceiling line of the bed-rooms of half brick in thickness instead of a brick. He, the district surveyor, finding it impossible, after many attempts, to see the man, had sent him a notice in a registered letter, in accordance with the 98th section of the Act. Adamson had written him word in reply, that he had ceased to be the builder. Upon this he, the district surveyor, had summoned Adamson; but when the day of hearing came, the officer of the court stated that he had been unable to serve the summons, as they denied any knowledge of him at the place of residence as stated by him to the district surveyor. Under the circumstances the case was adjourned until a summons could be sent in a registered letter. The district surveyor now asked for an order to amend. Adamson was called, but did not appear, and Mr. Norton granted an order.

The district surveyor then stated that the remaining four houses above named had been built with mud instead of mortar; that he, finding he never could see the builder, had sent him a notice in a registered letter, and had also posted one on the buildings, to the effect that the houses must be taken down; but, instead of complying, every effort had been made to finish the houses since the service of the notice. He produced specimens of the stuff used as mortar.

Mr. Norton said that it was absurd to call such stuff mortar: mortar required certain component parts, lime and sharp sand in well-known proportions. The stuff used appeared to contain little of either. He should therefore make an order that the houses be taken down.

Amongst other cases was that of H. C. Kemplin, who was building four houses on Green's property, opposite Adamson. The district surveyor produced specimens of the stuff used.

Kemplin, on being called on, said that it was all owing to spite on the part of the surveyor's clerk, Mr. Rawlings; that he had never seen Mr. Parsons there; and that he had witnesses to prove that the houses were well built.

John Edge stated he was a bricklayer, engaged in superintending the works. Kemplin asked him if he had seen Mr. Parsons's clerk pick up that morning a lump of mud from the road: he said he had; and, in reply to a question whether he had seen him take a piece from the walls, he said he was not in the building with him.

Mr. Parsons said that, thinking something of this kind might be attempted, he had taken the precaution to send two of his clerks, that one might corroborate the other.

Mr. Norton said he would hear them first.

Mr. W. H. Rawlings and Mr. William Huc accordingly identified the various packets of stuff from the buildings produced.

Edge, in reply to Mr. Parsons, admitted that he had been told by Mr. Parsons himself, when the walls were about two courses over the footings, that he would not sanction such stuff; and that Mr. Parsons had subsequently told him, when the walls were about scaffold high, that they must be taken down and rebuilt.

Mr. Norton said he had gone, at the district surveyor's request, with him to inspect the houses, and that they certainly were as he described. He saw Mr. Parsons with a very little exertion with one hand push down a considerable piece of a wall. In fact, he thought that mud cottages would be better and warmer than these. The district surveyor had his duty to do to the public, and he was doing it; and if he failed to do it he would be subject to censure. He ordered that the walls should be pulled down, and gave a week to do it in.

Kemplin and others have since taken down the obnoxious work. The district surveyor has applied to the Metropolitan Board of Works, under the 68th section, to indemnify him as to costs and results if he proceed *himself*, in Adamson's case, under the 47th section, and pull down the work.

FEES FROM TRADESMEN TO ARCHITECTS.

SIR,—The best way to stop the abominable system of fees from tradesmen to architects is to communicate to you the names of those who offer them; and I beg, therefore, to inclose a letter just received by me, and purporting to come from Messrs. Trestrail & Co., makers of kamptulicon, offering me, as architect of a new church, "a discount on any order that I may send."

GEORGE EDMUND STREET.

TUAM CATHEDRAL.

SIR,—Being the "Irish Correspondent" referred to in a letter on Tuam Cathedral in the *Builder* for January 10, I beg to trouble you with a few additional observations on the subject, which would have been forwarded before this, but for the delay in obtaining sketches.

The general character of the eastern portion of the building (my remark on which appears to have been taken exception to by Mr. Deane) is a question, satisfactorily to understand the merits of which requires a personal examination.

The drawings, however (from measurement), which I forward, will, I dare say, sufficiently explain the general grounds on which the antiquity of this portion of the building may be argued.

Whether the windows referred to by Mr. Deane are of an interesting or uninteresting type, is of course a matter of opinion, and does not necessarily affect the question of antiquity. They certainly present a pure and elaborate system of cusping. The east window (of five lights), especially the two easternmost windows, on both north and south sides, are of three lights, the others of two. Those on the south side are altogether perfect, of limestone, and vary in the design of their traceried heads, the outside jambs being formed of double chamfers.

That these stone windows are "the only architectural features deserving of such a name," is a statement which I must beg leave to correct. A few others exist, such, for instance, as a priest's doorway, now built up, but still apparent from its label moulding and the jamb of the opening on the south side. A piscina, which has evidently been a fine example when perfect, divided originally by a small central column, the cusped heads over which, with cusped circle in the spandril, the whole inclosed by a pointed segmental arch, with label mouldings over, still remain open to view, but in a rather mutilated condition. Close by this interesting feature, and in the position usually occupied by the *sedillia*, there exists in the wall, on the authority of the verger, an arch or recess, which, to say the least, is suggestive: if the plastering were removed, I have little doubt but that the moulding of the arches and other architectural features will be brought to light (I may mention that the cut stone work of this period in the building is of hard limestone, and therefore in good preservation, except where broken maliciously, or from carelessness).

In addition to these a complete *chancel arch* is to be seen. This is of a plain character, not unusual in Middle Pointed work, being composed of a series of chamfered rings, five in number; the whole width of the jamb being 5 feet.

This arch, which is the termination westwards of the Middle Pointed work, is built about 6 feet to the east of the Norman chancel, the centre line of each building being identical.

This exact position of the later chancel could hardly have been adopted without some particular object, and therefore the non-completion of the Middle Pointed building leaves it a matter of interesting conjecture as to what may have been the intended arrangement of the building of which the chancel only was carried out, more especially in regard to the disposition of the arch of Romanesque chancel.

The existence of such features as these, which are not generally considered as unimportant, though in the present case apparently overlooked by Mr. Deane, is, to my mind, quite sufficient to settle the question of antiquity, not only of the details themselves, but also of the walls in which they are to be found. It would appear to me most extraordinary, to say the least, that all these features, supposing them to be the *débris* of a former building, should be re-used so consistently for an after structure and built in so exactly in the proper places. Such a theory naturally suggests the question—where this former building existed? and if these are its *débris*, how is it that the windows and chancel arch are so perfect compared with the piscina? And also, at what particular period subsequent to what might be reasonably

taken as the life of a building erected in the fourteenth century, could such care have been evinced in the proper restoration of such things to their original places and uses?

The interior dimensions of the Romanesque chancel are about 18 feet 6 inches by 17 feet 6 inches; those of the Middle Pointed building 71 feet long by 27 feet wide. Which of these, or whether either of them should be removed in carrying out the proposed restoration (?), are points which I should prefer leaving in other hands for discussion, my object being merely to correct statements which appear to me to have been made without due consideration or examination of the existing buildings, and carrying with them all the more weight in emanating from an architect of Mr. Deane's well-known ability and archæological attainments. THOMAS DREW.

Books Received.

Contribution towards a History of Electro-Metallurgy; establishing the Origin of the Art. By HENRY DIRCKS, C.E. Spon, Bucklersbury. 1863.

THE great object of this volume is to show that Mr. Spencer, though one of the earliest improvers on the germ of electro-metallurgy, was not the originator of it. Mr. Dircks maintains that—

"Professor Daniel is the *discoverer* of the principle on which the deposition of compact copper depends; that Mr. C. J. Jordan [of whom a portrait is prefixed to Mr. Dircks's volume] is the *inventor* of the first application of that principle to useful purposes in the arts, known as electro-metallurgy; and that Mr. T. Spencer is the first of the class of *improvers* of this art, so invented."

But in thus distributing the merits of British subjects as regards the origination of electro-metallurgy, what of M. Jacobi, of St. Petersburg? Though his name does not appear in this summary, Mr. Dircks elsewhere acknowledges his part in it; as where he remarks that "in the instance of electro-metallurgy or electro-type, it is by no means singular to find Professor Jacobi in St. Petersburg, Mr. C. J. Jordan in London, and Mr. Spencer in Liverpool,—each one unknown to the other,—engaged on the same investigation." Here, by the way, Mr. Spencer is virtually admitted to be an independent originator of the process, and not a mere "improver" upon any one's origination but his own. In short, all three were joint originators of it even on Mr. Dircks's own showing. Mr. Jordan seems, however, to have been the first to publish some account of it (dated 22nd May, 1839) in the *Mechanics' Magazine* of 8th June, 1839; but Mr. Spencer, then of Liverpool, had written a general notice to the secretary of the Polytechnic Society on 9th May, 1839, that he was engaged in experiments that appeared to accord with those of Jacobi, which had been previously noticed in the *Athenæum*. The preliminary experiments of Dr. Golding Bird, published in the *Phil. Trans. for* 1837, ought also to be here mentioned in connexion with the subject; and that Mr. Spencer appears to have been one of those who were led by these experiments to turn their attention to the subject so early as 1837. Mr. John Dancer, also of Liverpool, was another of these.

VARIORUM.

"Monthly Supplement to the *Electrician*: Telegraphic Guide for February, 1863. Office, 32, Paternoster-row." This very useful Guide gives not only the names of telegraph stations throughout the three kingdoms and all over the Continent, but also the charges for messages of twenty words at every Continental station, the general charges throughout this country, and the times of opening and closing of each British station. There is also a telegraphic map of Europe, the whole surface of it interwoven as if with ganglial nerves, and showing the extraordinary progress of the electric telegraph within the last few years.——"A Treatise on the Culture of the Pine-apple. By Thomas Torbron. Second edition. Allen, Warwick-lane, Paternoster-row." Mr. Torbron states that his little treatise has been founded on long practice. This second edition contains also a plan for the introduction of the vine in the same chamber with the pine-apple, as also a shed for the cultivation of the mushroom; and he thus describes the plan of all three:—

"The plan represents a house 30 feet long, with a pit for tanners' bark 10 feet wide and 3 feet deep, with paths all round the pit 3 feet wide, and with flues round the pit, which, after the entrance of a draught of heat from the furnace, run right and left to the middle of the opposite end, and then divide, and return over the first course of the flues to the chimney in the north wall. A trellis covers the soil for the path. The vines are intended to be planted against the wall at the north end, or against the upright glass at the south end; then trained over the paths on wires at a convenient distance from the roof-glass, so as not to obstruct the perpendicular light from the pines. The plan represents vertical sashes, which are to slide; and shelves are intended for strawberries, hyacinths, tulips, pinks, and roses, in the forcing season. French beans may be grown on the flues in winter and spring. The shed at the north end represents shelves for mushroom-beds. The warmth from the fire in winter will be favourable to the growth of mushrooms. The shed-section also represents a chimney for the flues by dotted lines. The flues require to be covered with foot-tiles. The ground-plan and section show a 2-inch cavity between the wall of the pit and flues; and the dots in the ground plan show the course of a flue from the furnace to the lower flues."

The arrangement appears to be both convenient and economical.——The second number of the *Sculptor's Journal* is a considerable improvement on the first. It includes an illustration of the "Reading Girl."——The current number of the *Ecclesiologist* contains a paper on Auckland Castle, by Mr. W. Sidney Gibson, with plan and sketches to illustrate it, by Mr. F. R. Wilson.——Messrs. Hogg's series of "Books with a Meaning," is increasing in number, and will form a valuable library for young people presently. Amongst the most recent additions to it is "Our Untitled Nobility," by John Tillotson, with illustrations by Charles Green. The writer sets forth pleasantly the labours and merits of Dr. Smith, the geologist; Waghorn, of the overland route; Raikes; Captain Coram; the Brunels; and poor Cort, to whom for his processes in the iron manufacture the country owes so much and has paid so little. These lives teach that "it is the bravest and best thing in the world to be unselfish."

Miscellanea.

ENGINEERS.—We learn from the *Otago Times* of the 13th ult., that Mr. John Millar, C.E., has been appointed chief engineer of the city of Dunedin, at a salary of 1,000*l.* per annum. The Melbourne papers say:—"Mr. Millar will carry with him the best wishes of all his numerous friends in this colony."

THE MIDDLE LEVEL CATASTROPHE.—The liability of the Middle Level Commissioners to pay compensations for injuries occasioned by the recent floods is to be tested at the ensuing Norwich Assizes; upwards of 100 writs having been served upon the Commissioners. The cost of the various works already undertaken, excluding altogether the question of compensation, amounts to nearly 100,000*l.*

AN INTERNATIONAL PARCELS DELIVERY COMPANY.—"The Factage Parisien Paris General Parcels Post and International Carrying Company" is a new company, with a capital of 200,000*l.*, in 20*l.* shares, which is being got up both in Paris and in London, for the conveyance of packages between Paris and London, all parts of France, and throughout Europe as well. The projectors have already obtained a concession from the Prefect of the Seine and the Paris municipality, with liberty to form some eighty or ninety distinct stations or offices in Paris, and to load and unload in a way not hitherto allowable in that city. The shares have been partly disposed of in Paris, and are now being disposed of in London. The company have received favourable communications from the Great Northern, Great Western, and London and Dover directors; and Sir Cusack Roney, one of the directors of the London and Dover, Mr. L. Simpson, a director of the Great Eastern, and Sir James Carmichael, bart., chairman of the Submarine Telegraph Company, are directors of this International Parcels Delivery Company, which appears to be a very promising speculation, as the fact of its shares being already at a premium seems also to show.

THAMES EMBANKMENT: NEW STREET.—Mr. Cowper has obtained leave, after some discussion in the Commons, to bring in a Bill to authorize the Metropolitan Board of Works to make a new street from the termination of the Thames Embankment at Blackfriars Bridge to the Mansion House, thus completing the new thoroughfare from Westminster to the City. One of the most urgent wants of the metropolis, he remarked, was a thoroughfare connecting the central parts of the City with Westminster and Charing-cross. At present there was thrown into Cheapside not only the traffic which reached it by the Strand, but the traffic which came from the north-east of London by Holborn. What was absolutely required was a new and distinct thoroughfare which would enable persons to pass from the centres of commercial activity about the Mansion House, the Exchange, and the Bank, to the points of Charing-cross and Westminster. The cost of the works was estimated at 600,000*l.*, to be afterwards provided for, not by direct taxation, but by a continuance of the charges on the coal duties for a further period of ten years beyond 1871, as it was feared the Thames Embankment fund would not suffice for these additional works.

PREVENTION OF FIRES IN THE METROPOLIS.—In reply to Mr. Hankey, in the Commons, Sir G. Grey has announced that it is intended to introduce a Bill this session for the better prevention of fires in the metropolis. It would not, however, be based on the recommendations of the committee of last year, which involved the putting an end to the entire system as it was now carried on.

THE PNEUMATIC DESPATCH COMPANY.—This company now proposes to extend its sphere, as well as its means of communication. The tubes are to be enlarged to 4 feet, and are to be arranged for the conveyance of such passengers as may venture on this mode of transit, as well as for packages and parcels. The proposed line is to have stations at Camden Town, the General Post-office, Covent Garden, and the City; and is to be about five miles long, and to be completed within a year.

CURIOUS DISCOVERY AT POMPEII.—A Naples letter states that a very interesting discovery has just been made by M. Fiorelli, the inspector of the excavations at Pompeii. He has found in hardened ashes the perfect mould of a man in a lying posture, and the skeleton entire. M. Fiorelli caused plaster of Paris to be poured into the form of the Pompeiian, and the coating succeeded perfectly, with the exception of two fragments of an arm and a leg, where the mould was incomplete. The cast of the man is of the greatest precision: the moustache, the hair, the folds of the dress and the sandals are all admirably defined. The famous question of the Thesaurum of Gronovius and Grevius, says *Galignani*, in reporting this discovery, is now decided: the Romans did wear drawers. Also archæologists will be delighted at discovering the manner in which the ancients fastened their sandals, and at seeing the heel of a shoe completely protected with iron.

CHESTER TOWN-HALL.—At a recent meeting of the committee of council for restoring or rebuilding the Town-hall, Mr. Holme, of Liverpool, builder, reported on the state of the edifice since the fire. Mr. Holme says, in his report, "I acknowledge a strong inclination to preserve, if possible, an edifice so much in accordance with the general architectural character of your venerable city; but the destruction has been so great, the damage so extensive, and the reasons against repair are so formidable, that I am decidedly of opinion you would not be justified in any other course than taking down the existing ruins, and erecting a new structure. . . . The only conclusion at which I can arrive is, that it is your best economy to take down the whole of the existing structure, and to re-use the materials, as far as they will go, in the erection of an entirely new building. It is going beyond the letter of my instructions, but I hope that I shall be pardoned for suggesting that, should you adopt my conclusions, instead of rebuilding on the present contracted site, the opportunity is favourable for considering whether an edifice which was suitable in the reign of Queen Anne is sufficient for the present day and for the growing population and trade of your city and its vicinity. And also, whether you may not, with great public advantage, embrace this opportunity of centralizing all your municipal and various other public offices and establishments under one roof."

THE PROPOSED ADDITIONAL WATER SUPPLY FOR ROTHERHAM.—The Sheffield Town Council's Sanitary Committee have resolved to resist the Bill in Parliament for increasing the water supply of Rotherham and Kimberworth by collecting the water from various brooks, on the ground that the diversion of so much water from the Don will materially reduce the supply of the borough. A correspondent of our own, dating from St. John, and signing himself "A Rotherham Ratepayer in the West Indies," also protests against the scheme as unnecessarily costly. He is urgent that the supply should be improved; and, indeed, as our readers may remember, wrote to us before on the subject; but knowing the locality and what is meant to be done, he maintains that besides the 27,000*l.* admittedly all but thrown away already on the water supply, the new scheme will cost not less than 20,000*l.* more. He proposes that water should be taken at once from the Rother above Carlton Mill, and thus save so many scattered reservoirs and other costs; and, looking to the quality of the water, he thinks that from a small stream like the Rother, rising in high lands, and not much subject to contamination, the supply might be made unobjectionable. The present supply, he says, is partly gathered from perforated pipes laid almost side by side with the sewers to catch the springs there; and sewage, he conceives, may have percolated into the water supply, and assisted in producing the epidemic.

TURKISH POSTAGE STAMPS.—Turkey has just issued postage stamps, having long been the only Power in Europe that had not adopted that mode of paying for letters. The Turkish stamps are of four different colours, and all bear the signature of the Sultan Abdul-Azizi; the Mahomedan religion interdicting the representation of the face or person.

EFFECT OF SUN ON OIL PAINTINGS.—A correspondent writes from Stuttgardt, stating that Wilkie's picture, "The Reading of the Will," which was purchased for the gallery of the King of Bavaria at the sale of the late Earl of Mulgrave's gallery, is exposed to the sun's scorching rays, which have as it were melted the oil or colours, and also very much affected the tone of the colouring; and that there are cracks nearly one-eighth of an inch apart in many parts. It should be looked to.

BRIGHTON DRAINAGE.—We understand from the local *Herald*, that a meeting recently took place in the town-hall, at which the works committee,—assisted by their consulting engineer, Mr. Hawkesly,—and Mr. Somers Clarke, and the chairman and a deputation of the drainage committee, with Mr. McClean and Mr. Wright, the engineers, were present; when several inquiries were made of the latter gentlemen as to the details of their plan of drainage for carrying the sewage of the town beyond Rottingdean; and, after a discussion which lasted nearly three hours, it was arranged that certain other engineering points and questions relative to the proposed design should be prepared by Mr. Hawkesly for the works committee, and submitted to Mr. McClean and Mr. Wright for their elucidation and answer.

PHOTOGRAPHIC STATISTICS: INTERNATIONAL EXHIBITION.—Some very interesting statistical facts relating to the immense consumption of photographic chemicals by the London Stereoscopic and Photographic Company have recently been made public. The number of glass negatives taken at the Exhibition (from which the paper pictures are printed) amounts to very many thousands:—

The paper used was	300 reams.
Albumen for ditto, about....	280 gallons.
Nitrate of silver.....	4,000 ounces.
Gold	90,000 grains.
Hypho sulp. soda	4,800 lb.

The photographic pictures produced from this immense amount of material are now approaching 1,000,000! Since the close of the Exhibition a new development of trade has sprung up in these photographs. It is reported that the Company received orders on one day for upwards of 11,000 of them.—*Post Magazine.*

POPULAR ERROR REGARDING THE WANT OF UNIFORMITY IN THE THICKNESS OF THE ANNULAR RINGS OF TREES.—On reference to the cross section of a newly-felled tree, it will be observed that the timber has not formed of uniform thickness round the pith of the tree. This is uniformly the case towards the base of the spruce, Scotch fir, and larch. The popular belief is, that the wood forms faster towards the side most exposed to the light and the heat of the sun's rays. Were this the case, it would prove that we have more of these from the south-east than from any other quarter. The prevailing high winds in Britain are from the north-west or south-west, and they usually blow hardest in autumn, when the young wood is most liable to be permanently bent in any given direction. This makes the top lean towards the north-east or south-east; and, by one of the many admirable compensating operations of the Great Creator, the wood at the base grows fastest on those sides, so that it may act as a natural buttress, and maintain the centre of gravity.—*Rait.*

THE NEW ASSIZE COURTS, MANCHESTER.—The new Assize Courts in Strangeways are rapidly approaching completion. The semi-detached portion of the building at the north-west end, and which is to form the judges' lodgings, is completed, except the tiling of the floors and some few details of minor importance. The whole of the main building, except the tower and smaller apartments, is roofed, and the greater part covered in. It is the intention of the committee and their architect to open out the building to the street in the course of a few weeks; so that the boundary-walls and general approaches may be proceeded with. The chief tower has been raised 70 feet above the ground-line; but at this level it has been thought advisable to let the work stand for a few months to consolidate. Mr. Bramall, the general contractor for the building, is making great exertions to forward the progress of the works; and it is hoped that, by the end of the year, the building will be far advanced towards its completion.

THE TEMPLE CHURCH, LONDON.—We understand the Benchers have decided on restoring the conical roof to the "round" of the Temple Church.

THE WOLVERHAMPTON SEWERAGE QUESTION. The Town Council have resolved "That Mr. Curley, C.E., of Hereford, be appointed to examine and report upon the proposed scheme of sewerage for this borough for the sum of 65*l.*, and that the town clerk prepare the necessary contract, and affix the corporate seal thereto."

THE COLOSSEUM.—An old subscriber of the *Athenæum*, in reply to a query why the word should be "Colosseum," and not "Coliseum," writes to say that in vol. ii. of the "Lives of the Roman Empresses," p. 50 (edit. Naples, 1768), there is a note which gives the reason for using the orthography as first above given. Referring to the completion of the great Amphitheatre by Titus, the note has the following:—"Nel mezzo dell' Anfiteatro si sorgeva una grande statua rappresentante Nerone, chiamata il Colosso di Nerone, da cui quel luogo prese il nome di Colosseo."

THE OTTOMAN NATIONAL EXHIBITION AT CONSTANTINOPLE.—Goods continue to come in plentifully, particularly from Toulcha, Varna, and Tirnova. Of the metropolitan guilds, the brass-workers, according to the *Levant Herald*, have sent in some creditable specimens of their handicraft, whilst private mechanics have contributed additional models of steam-engines, all distinguished by some peculiarity of construction or intended result. The locally-famed *savant* and numismatist Subhi Bey, ex-minister of the Evcaf, has promised to lend his admirable collection of medals and Ottoman antiquities. From England there are large coming consignments of agricultural implements. The Porte has also directed Musurus Bey to provide from England a complete and varied collection of cotton-gins and other allied machinery. The building was to be opened on the 19th instant.

STATE OF BROMPTON, IN YORKSHIRE.—The district registrar of Northallerton, speaking of the unsatisfactory condition of the district, says,—"Drainage is very bad, and heaps of putrifying filth are allowed to lie close to the dwellings of the poor. I particularly refer to the village of Brompton, where for some time synochus, typhoid fever, and typhus have been very prevalent. Here I find no drainage at all, no proper cesspools; yards unpaved, and dungheaps unremoved; the floors of the dwelling-houses beneath the level of surrounding land; and, what is still worse, the inhabitants appear to have a dread of ventilation. For years this village has been little else than a hotbed of fever, but this fact has not induced the authorities to adopt means of prevention. The mortality of children is excessive. Many infants are, when a few weeks old, left to the care of mere children, going for days without their natural food, but fed on scanty and improper diet. They die literally from neglect."

MORTALITY DURING LAST QUARTER.—The mortality in England and Wales in the last quarter of 1862 was at the rate of 2·226 per cent.: in 1860 it was 2·043; in 1861, 2·061. Though the autumn of 1862 was not as a whole colder than those of 1860 and 1861, the sudden invasion of cold in November, and the abrupt succession of heat are given to account for its having been the most fatal. The Registrar-General in his *Report* says,—The north-western counties, Yorkshire, London, the northern counties, and the west midland are the five divisions in which the highest rate of mortality prevailed. In the first which contains the districts of the cotton manufacture, the rate—2·66 per cent.—was higher than in any other division. This distinction is not of recent birth: it is not the fruit of adverse circumstances, but has sprung from causes which have been in operation since Liverpool, Manchester, and other towns, in what has been called the worst drained part of England, rose into importance as seats of commerce and manufacture. But whatever be the sanitary condition of the towns and villages they inhabit, human beings must be affected by the atmosphere in which they are immersed, and the effects of which they can but partially control; and as the cotton districts participated with the rest of the kingdom in the benefit of a healthy summer, they have also suffered, like other parts, from a less healthy autumn. . . . Scarlatina and diphtheria, and also diarrhœa, prevailed to a considerable extent in Manchester. An increase of deaths in Ashton-under-Lyne is attributed to scarlatina and measles. Scarlatina caused eighty deaths, being a third part of the total number, in Oldham-above-Town: these occurred not only in the working-class, but in the general population.

NEW CARLISLE BRIDGE, DUBLIN, COMPETITION.—In reply to several indignant competitors, who point out that "it is now twelve months since the designs were advertised for, and over nine months since they were submitted, and yet it appears that no decision has been come to," and who ask for information, we are unable to say anything satisfactory. Some pressure should be brought to bear on the committee.

ALBERT MEMORIALS.—It has been decided, if the corporation concur, to place the Manchester statue in the centre of a new and extended area of buildings at Bancroft-street, to be named Albert-square, which will be between two and three times larger than St. Ann's-square.——Designs for the Abingdon memorial have been submitted by Mr. J. Gibbs, of Oxford, architect, and a committee has been formed and liberal subscriptions already contributed.

EDINBURGH.—The *Scotsman* says that the suggestions recently made for the decoration of the walls of the Great Hall in the Parliament House, by hanging there the portraits, scattered through various parts of the building, of judges and other eminent personages, has been carried into effect. The east wall is now tolerably well clothed by these portraits, and the improvement in the aspect of the hall is very marked. They have been hung under the superintendence of Mr. Charles Robertson, treasurer to the faculty, the larger and the smaller pictures being judiciously alternated and adapted to the nature of the spaces as these are broken up by doors, niches, and statues. There is room for many more, and no doubt time will add to the collection.

RENOVATING FLOWER-BEDS.—If the exhausted beds have a good bottom, we advise removing the top spit, and replacing it with a mixture of virgin earth from an upland mixture, well chopped up with old chippy cow-dung, and a good proportion of leaf mould; say, if you can obtain the quantities, equal parts of each of the three ingredients. If you can get the beds empty this winter, the best way will be to take off the top spit, and fork over the subsoil, so as to let the frost and snow penetrate it; then get a good supply of burnt clay, and hotbed dung, and chop them down together in a ridge, and let them be well frozen, and fill up the beds with the mixture early in March, and they will be in admirable condition for planting as soon as they have settled. Chippings of hedges, refuse wood, straw, &c., built up over a hole, and packed round with cakes of old turf, and then burnt, make a capital dressing to dig into the old soil if you cannot well get new material to replace the worn-out stuff. If used chiefly for bedding plants, a compost of leaf-mould, and sandy soil from a common, equal parts, and one-fifth of the whole very old dung, would prove a good mixture. Bedding plants do not require a rich soil so much as a *new* soil.—*Gardener's Weekly Magazine, and Floricultural Cabinet.*

THE "AURA ELECTRIC GAS LIGHT."—Men of science seem resolved not to rest till something quite resplendent in the form of *light* shall be discovered. As for the merits of the following we as yet know nothing, but it appears to be a step towards the ulterior manifestation of the "new light," for which every one is looking:—"Mr. J. Grosmith," says a contemporary, "claims the application of a new improved radiator, which acts upon a solid, and by the use of multiplied interwoven galvano-electric metals he aërates a liquid, from which light is generated through horizontal arrangements. The inventor claims a new mode of presenting multiplied surfaces, by which he produces a carburetted hydrogen gas, most brilliant and lasting: he employs no fire nor heat whatever, but furnishes an improved apparatus by the cold process of generating gas: he uses no vertical tubes, nor cotton, nor any vertical arrangements of tubes for capillary action. . . . He reserves the exclusive use of his apparatus for every purpose to which it may be found applicable in the carburization of common coal gas, to which it imparts a threefold luminosity; as also in the generation of the aura electric gas. Its advantages are—1. The aura electric light can be used in any house, or large establishment, without fire, retorts, or gasholders. 2. That it gives a more intense light, without smell or smoke: the ordinary gas fittings are available, excepting the burners only. 3. It will cost less by one-half in the whole apparatus complete than that of the ordinary gas. 4. When required for enriching common coal gas, it only has to be passed through a photogenic cylinder, when three times the light is evident, while the consumption of the gas is lessened to one-fourth of its usual quantity. The light may be seen at Mr. J. Grossmith's, 85, Newgate-street."

ELECTRO-TELEGRAPHIC.—At the half-yearly meeting of the Electric and International Telegraph Company the directors' report, recommending a dividend of 3½ per cent. for the half-year, was unanimously adopted.

CONDITION OF LEEDS.—We have noticed with interest the reports of the medical officers of the Leeds commission for ascertaining the cause of the present deplorable state of the health of Leeds. It is rather amusing to see the admissions now made by the doctors, when the howl of indignation is remembered which followed our article two years ago, in which we dared to hint that the whole town was slightly dirty, and not altogether healthy. We shall be amply rewarded, however, if improvements follow.

TRADE LISTS.—The new pamphlet issued by the St. Pancras Iron Work Company (Old Pancras Road) is fully illustrated, especially as to stable arrangements and farm-fittings, and will be found a useful guide as to price.——W. Dawbarn & Co.'s List of Prices (Liverpool) is something more than it professes to be, for it contains a number of useful tables and many items of information. Timber, sanitary ware, slating, masonry, &c., are all included.——The illustrated list of George Smith & Co. (Iron Foundry, Glasgow) describes, amongst other things, their "Dry Deodorising Closets," which in some situations have their advantages.

BACHELORS' CHAMBERS IN MANCHESTER.—A company, with 20,000*l.* capital, is being formed in Manchester, for the purpose of providing a superior class of handsomely-furnished private apartments for bachelors resident in Manchester. A site has been secured fronting the Oxford-road, within a mile and a half of the Exchange, and plans have been prepared, by Messrs. Pennington & Bridgen, architects, for a building to contain from thirty to forty suites of apartments, baths, &c., on each floor, and additional large rooms for dining and other purposes; also, stables and coach-houses attached. It is proposed that the rentals of the various suites (including coals, gas, and attendance) shall range from 50*l.* to 100*l.* a year, thus producing about 3,000*l.* a year upon the capital.

"THE CRUCIFIXION," BY MR. H. C. SELOUS.—This very remarkable picture, now exhibiting at 62, Cheapside, should be visited. It is the most important work yet produced by the artist, and will more than compensate for all the danger of a journey into the City; no trifle now-a-days, when a "block" at Bridge-street may keep you there twenty minutes. Mr. Selous has brought the crowd into the foreground: a ray of light from the stormy sky illumines the Crucified Christ in the middle distance: the background is filled with mighty towers, temples, porticos, and colosseums, idealizing Jerusalem. It is not so much a picture of individual expression as of general sentiment; still amongst the 300 figures which fill a canvas 14 feet long and 8 feet high, will be recognized characters prominent in the life of Christ. We offer our congratulations to Mr. Selous on the successful completion of this arduous and beautiful work.

CHURCH BELLS.—In a late number of your journal is a paper on bells, in which are some interesting remarks. May I solicit a corner for a few lines on the neglect of supplying our new metropolitan churches with this useful appendage in its way? If we turn westward, we find that not one church, from St. Giles's (close by the bottom of Old Oxford-street) to a distance of three miles, bearing to the right, has a peal, although the steeples to some of them, from their noble proportions and the taste displayed by their architects, warrant their being supplied with this appendage, without which I consider a church steeple like a body without a soul. Near the Edgeware-road is a church tower large enough for a peal of eight of twenty-three hundredweight tenor, which at present can only boast of five, the largest weighing only eight hundredweight. After this we meet not with another church with a peal till we arrive at the foot of Highgate-hill. The art of change-ringing on bells hung to be raised and rung on the balance, the bell making a circle each time the clapper strikes a blow, is exclusively English, and a national auxiliary that has been used for centuries in awakening feelings of joy when rung on particular days during the year. A small subscription among the parishioners would defray the cost of a peal, and a further grant from the rates, not in amount to bear upon their pockets, would secure the services of a set of ringers; and thus, in districts where a stillness prevails, particularly in the evening, a merry peal would enliven the spirits of the surrounding inhabitants.

HAYDN WILSON.

MINERAL COLOURS.—Some valuable mineral paints have, it is reported, been discovered in California, producing respectively the four colours red, yellow, green, and blue. The minerals are chiefly terra sienna, lazulite, sienite, and wacke. They are found in the El Hambre Creek, near the town of Martinez.

"NEW LAMPS FOR OLD."—According to a local paper, a portion of the old painting on the roof of the parish church at St. Neots, supposed to have been painted some centuries back, has been taken down and replaced by others, executed after the same style as the original. The more's the pity.

THE OIL SPRINGS.—Canadian papers state that, owing to the sudden and almost universal cessation of the flowing wells, there is quite a panic among the dealers; and until the result of putting down pumps has been ascertained, contracts cannot be negotiated. Much of the paraffine of commerce, however, is got from other mineral sources, and doubtless will continue to be so got, independently of the oil-wells, as it was before they were discovered.

CITY OF LONDON PAUPER LUNATIC ASYLUM. We hear that Messrs. Piper & Wheeler, the contractors for these works, are making rapid progress with them, the whole of the brickwork (with the exception of the chapel) being nearly completed. The roof-timbers are fixed, and the tiling is in a forward state. The tower in the centre of the building is carried up to a considerable height, and the stonework forming the brackets and cornice is now being set. Mr. Bunning is the architect.

PREVENTION OF MINING ACCIDENTS. — Mr. John Phillips has deposited in the Mechanics' Institute a model of an ingenious contrivance for obviating the commonly fatal results from the breakage of shaft gear. The model is somewhat after Fourdrinier's principle, and represents a shaft with projecting board edges. To the bucket are attached spring handles, which, while the rope is at tension by the weight of either the empty or full bucket, are clear of the sides of the shaft, but which, upon a snapping of the rope, spring out, catch hold of the bevelled edges of the shaft sides, and thus arrest the descent of the bucket or cage.—*Ballarat Star.*

DOUBLE-ACTING VENTILATOR FOR RAILWAY AND OTHER CARRIAGES.—An ingenious and simple apparatus for this purpose has been patented by Mr. M. Wigzell, of Topsham, in Devonshire. It is intended to be inserted in a convenient position, such as above the glass slide in the door of the carriage; and may be briefly described as consisting of a double tube put together in a T form, and inserted horizontally, so that the mouth of the inlet tube will open forward on the route of the carriage, while the mouth of the outlet tube opens in the opposite direction. There are of course interior openings, one for admitting the fresh air, and the other for egress of the foul.

LECTURE ON LIGHT AT THE ROYAL INSTITUTION.—Dr. Frankland has been lecturing on artificial illumination. During the last ten years there had not been any important improvements in the manufacture of coal gas, though several new means of obtaining light for illumination had become known, the most interesting of which was the electric light. After explaining the various forms of the electric light, including the magneto-electric at the South Foreland, the lecturer turned to gas light, and explained, and illustrated by experiment, the Rev. Mr. Bowditch's plan for purifying gas from the obnoxious and pertinacious sulphide of carbon by heated hydrate of lime. Paraffine and petroleum were then noticed, and the value of these substances was compared with that of spermaceti, gas, and other illuminating agents. Assuming that the light of 20 spermaceti candles, burning for 10 hours, cost 6*s.* 8*d.*, the cost of wax to produce the same amount of light would be 7*s.* 6*d.*; of tallow, 2*s.* 6*d.*; of sperm oil, 1*s.* 3*d.*; of paraffine, 7*d.*; of common coal gas, 4*d.*; and of cannel gas, 3*d.* Dr. Frankland exhibited a reading lamp, so contrived that by an external glass the air descends in contact with the heated chimney before it reaches the flame, and by this simple means the light is increased 30 per cent. The lecturer concluded by alluding to thermo-electricity as a power that might possibly become valuable for illumination.

TENDERS.

For works at 15, Clement's-lane, City (exclusive of fittings). Mr. William Roe, architect:—

John Clemence	£1,590	0	0
Hill, Keddell, & Robinson	1,522	0	0
Marsland & Son	1,400	0	0
Bowley, Bros.	1,350	0	0

For 462 feet of iron railing, with dwarf wall and iron curb, Orphan Working School, Haverstock-hill. Mr. James Harrison, architect:—

Ennor	£396	0	0
Perry & Judson	370	0	0
Coleman	349	0	0
Thurlow	238	10	0

For alterations, Ockendon House, Lower-road, Islington. Mr. James Harrison, architect:—

Gadsby	£459	0	0
Ennor	388	10	0
Johnson & Cooper	379	0	0
Wheen	307	0	0

For rebuilding Llanychllwydog Church, Pembrokeshire. Mr. Withers, architect:—

Davies	£530	0	0
Thomas	470	0	0

For building new parsonage-house, Lyss, Hampshire. Mr. Withers, architect. Quantities supplied by Mr. Poland:—

Bond	£1,874	0	0
Simms	1,849	0	0
Tracey & Co	1,806	0	0
Moon & Son	1,792	12	11
Elliott	1,763	0	0
Ellis	1,757	0	0
James & Ashton	1,723	0	0
Firtcher	1,617	3	7
Lewis	1,599	0	0
Rogers & Booth	1,535	17	0
Barnes	1,506	0	0
Sharpington & Cole	1,475	0	0

For new parsonage-house at Turnditch, Derbyshire. Messrs. Giles & Brookhouse, architects, Derby:—

Woolley	£1,287	0	0
Lilley	1,209	0	0
Oldershaw	1,205	0	0
Hall	1,180	0	0
Cash	1,165	0	0
Sheppard	1,141	0	0
Dusantoy	1,141	0	0
Gadsby	1,141	0	0
Thompson	1,124	0	0
Thompson & Fryer	1,100	0	0
Robinson	1,100	0	0
W. & C. Bridgart (accepted)	1,065	0	0

For cottage residence, &c., at Borrowash, Derby, for the Right Hon. the Countess of Harrington (first contract). Messrs. Giles & Brookhouse, architects:—

Gresley	£478	0	0
R. Bridgart	389	0	0
Dusantoy	378	0	0
Thompson & Fryer (accepted)	370	0	0

For building four cottages, for Mr. E. Edwards, of Tonbridge Wells. Mr. Bond, architect:—

Weeks	£435	18	0
Walker	435	11	2
Strange	432	9	8
Perigoe	385	0	0
Mercer & Camfield	378	13	0

For repairs and painting to No. 13, Upper Seymour-street West. Mr. Withers, architect. Quantities supplied by Mr. Poland:—

Sharpington & Cole	£127	0	0
Carman	118	10	0
Sanders	117	0	0
Thompson	114	9	0
Tracey & Co.	92	0	0

For sundry works in alterations, repairs, painting, and decorating, to mansion, offices, stables, &c., at Sunningdale Park, Berks, for Sir Charles Decimus Crosley. Mr. Alfred Smith, architect:—

Works to Mansion and Offices.

Foster	£2,545	0	0
Mansfield	2,439	0	0
Macey	2,390	0	0
Norris	2,094	0	0
Holland & Hannen (accepted)	1,812	0	0

Works to Stables and Outbuildings.

Foster	£967	0	0
Norris	960	0	0
Macey	899	0	0
Mansfield	890	0	0
Holland & Hannen (accepted)	810	0	0

For rebuilding No. 102, Jermyn-street, St. James's, Westminster. Mr. John Blore, architect. Quantities supplied by Messrs. Meakin & Dudgeon:—

Wardle & Baker	£2,820	0	0
Bottom & Co.	2,760	0	0
Sharpington & Co.	2,759	0	0
Waters & Saintey	2,715	0	0
Palmer	2,624	0	0
Hill, Kettle, & Robinson	2,608	0	0
Simms	2,398	0	0
H. & C. Bond	2,378	15	0
Ward	2,332	0	0
Wilson	2,300	0	0
Marshall	2,297	17	0
Thompson	2,284	0	0
Stevenson	2,282	0	0
Jackson, Shaw, & Oliver	2,268	0	0
Scrivener & White	2,265	0	0
James & Ashtons	2,259	5	0
Rowe	2,111	0	0
Rudkin (accepted)	2,088	0	0

The adjoining house, No. 103, is about to be rebuilt by Messrs. I'Anson, for 1,447*l.*, under the same architect.

For making and fixing an eight-day turret-clock complete, with four dials, and fixing hour and quarter bells, three in number, for the Liverpool Cemetery, Anfield Park, the tender of Messrs. T. Cooke & Sons, of York, 174*l.*, was accepted; and to supply the bells at 10*l.* per cwt.